This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

30,698

THE UNIVERSITY OF MICHIGAN · LIBRARIES ·

UNIVERSITY BULLETIN

NEW SERIES, VOL. VI, NO. 11. JUNE, 1905

ENGIN
T
171
.M622
1905/06 –
1906/07

UNIVERSITY OF MICHIGAN

Department of Engineering

GENERAL ANNOUNCEMENT
1905-1906

Ann Arbor
PUBLISHED BY THE UNIVERSITY
1905

UNIVERSITY OF MICHIGAN

Department of Engineering

GENERAL ANNOUNCEMENT
1905-1906

CATALOGUE OF STUDENTS FOR 1904-1905

REGISTER OF ALUMNI
CLASSES 1860 TO 1904 INCLUSIVE

Ann Arbor, Mich.
PUBLISHED BY THE UNIVERSITY
1905

Announcements

1905–1906

1905.	
Feb. 10-11.	Examination for Admission.
Feb. 13.	SECOND SEMESTER BEGINS.
April 14.	(Evening.) Recess begins, ending April 24 (evening).
June 20.	Class Day.
June 21.	Alumni Day.
June 22.	COMMENCEMENT IN ALL DEPARTMENTS.
June 23 to Sept. 25.	Summer Vacation.
June 26 to Aug. 4.	Summer Session of the Department of Engineering and of the Department of Literature, Science, and the Arts.
Sept. 20 to 23.	*Examination for admission to the Department of Engineering.*
Sept. 26.	FIRST SEMESTER BEGINS IN ALL DEPARTMENTS.
Nov. —	Thanksgiving Recess of three days, beginning Tuesday evening.
Dec. 21.	(Evening.) Holiday Vacation begins.
1906.	
Jan. 9.	Exercises resumed after Holiday Vacation.
Feb. 9.	(Evening.) FIRST SEMESTER CLOSES.
Feb. 9-10.	*Examination for Admission.*
Feb. 12.	SECOND SEMESTER BEGINS.
April 13.	(Evening.) Recess begins, ending April 23 (evening).
June 21.	COMMENCEMENT IN ALL DEPARTMENTS.

1905

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
JAN.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31				
FEB.				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28				
MAR.				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	
APRIL.							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30						

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
MAY.		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31			
JUNE.					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	
JULY.							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31					
AUG.			1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31		

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
SEPT.						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
OCT'R.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31				
NOV.				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30		
DEC.						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31						

1906

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
JAN.		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31			
FEB.					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28			
MAR.					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
APRIL.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	28	24	25	26	27	28
	29	30					

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
MAY.			1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	5	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31		
JUNE.						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
JULY.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31				
AUG.				1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	

	Sunday.	Monday.	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
SEPT.							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30						
OCT'R.		1	2	3	4	5	6
	7	8	9	10	1	12	13
	14	15	16	17	8	19	20
	21	22	23	24	25	26	27
	28	29	30	31			
NOV.					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	
DEC.							1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31					

Members of the Faculty

AND OTHER OFFICERS*

JAMES BURRILL ANGELL, LL.D., PRESIDENT.
South University Avenue.

MORTIMER ELWYN COOLEY, M.E., *Professor of Mechanical Engineering and Dean of the Department of Engineering.*
314 North Ingalls Street.

CHARLES SIMEON DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.* 502 East Huron Street.

HENRY SMITH CARHART, LL.D., *Professor of Physics and Director of the Physical Laboratory.* 521 Monroe Street.

RAYMOND CAZALLIS DAVIS, A.M., *Librarian.*
521 Church Street.

JEROME CYRIL KNOWLTON, A.B., LL.B., *Marshall Professor of Law.* 1429 Hill Street.

OTIS COE JOHNSON, PH.C., A.M., *Professor of Applied Chemistry.* 730 South Thayer Street.

JOSEPH BAKER DAVIS, C.E., *Professor of Geodesy and Surveying and Associate Dean of the Department of Engineering.* 731 South Ingalls Street.

ISRAEL COOK RUSSELL, C.E., LL.D., *Professor of Geology.*
1703 Hill Street.

FRED NEWTON SCOTT, PH.D., *Professor of Rhetoric.*
1351 Washtenaw Avenue.

EDWARD DEMILLE CAMPBELL, B.S., *Professor of Chemical Engineering and Analytical Chemistry and Director of the Chemical Laboratory.* 1555 Washtenaw Avenue.

FILIBERT ROTH, B.S., *Professor of Forestry.*
730 South State Street.

ALEXANDER ZIWET, C.E., *Professor of Mathematics, in charge of Mathematics in this Department.*
644 South Ingalls Street.

HERBERT CHARLES SADLER, Sc.D., *Professor of Naval Architecture.* 701 South State Street.

---

*In this list are included the names of a few officers and instructors with whom engineering students may have occasion to confer.

*——————, ——., *Instructor in Civil Engineering.*
——————.

*——————, ——., *Instructor in Surveying.*
——————.

*——————, ——., *Instructor in Descriptive Geometry and Drawing.*
——————.

FRANK JOHN MELLENCAMP, A.B., *Assistant in Physics.*
509 Forest Avenue, Ypsilanti.

HORACE WINCHESTER MILLER, Jr., B.S., *Assistant in Mechanical Engineering.*

ALEXANDER MacDONALD GRAVER, B.S., *Assistant in Mechanical Engineering.*

RALZEMOND DRAKE PARKER, B.S., *Assistant in Mechanical Engineering.*

*——————, ——., *Assistant in Mechanical Engineering.*
——————.

M. EVERETT DICK, *Assistant in Quantitative Analysis.*
——————.

FREDERICK EDWIN PARK, *Assistant in Chemical Technology.*
——————.

WALTER TURNER FISHLEIGH, A.B., *Assistant in Descriptive Geometry and Drawing.*
——————.

BELA LAVERNE COGSHALL, *Assistant in Descriptive Geometry and Drawing.*
——————.

*——————, ——., *Assistant in Engineering Chemistry.*
——————.

*——————, ——., *Assistant in Physics.*
——————.

*——————, ——., *Assistant in Surveying.*
——————.

*——————, ——., *Assistant in Surveying.*
——————.

*——————, ——., *Assistant in Surveying.*
——————.

*——————, ——., *Assistant in Surveying.*
——————.

Instructors and Assistants in the Engineering Shops

ROBERT ALEXANDER WINSLOW, *Instructor in the Foundry.*
947 Wall Street.

HORACE TRAITON PURFIELD, *Instructor in Carpentry and Pattern-making.*
634 South Twelfth Street.

---

*Vacancy to be filled.

Department of Engineering

GENERAL INFORMATION

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental announcement. The various Faculties include about two hundred officers of instruction, besides nearly one hundred assistants, some of whom participate in the work of teaching. Forty-one hundred and thirty-eight students, representing all the States and Territories and many foreign countries, are in attendance.

In the legislative act under which the University was organized in 1837, provision was made for instruction in engineering. There are few older technical schools in the United States. Work was begun in this line in 1853, and the first degrees were conferred in 1860. The engineering courses were included in the Department of Literature, Science, and the Arts, until the close of the collegiate year 1894-95. At that time the Department of Engineering was established by the Board of Regents.

This Department has enrolled at present nine hundred and ninety-five students, pursuing work in different engineering lines. In this number are not included those studying chemistry and other branches of science.

Persons who wish to become professional engineers are offered here thorough courses of study in civil, mechanical, electrical, chemical, and marine engineering,

Announcements

1905–1906

1905.	
Feb. 10-11. .	Examination for Admission.
Feb. 13.	Second Semester Begins.
April 14.	(Evening.) Recess begins, ending April 24 (evening).
June 20.	Class Day.
June 21.	Alumni Day.
June 22.	Commencement in All Departments.
June 23 to Sept. 25.	Summer Vacation.
June 26 to Aug. 4.	Summer Session of the Department of Engineering and of the Department of Literature, Science, and the Arts.
Sept. 20 to 23.	*Examination for admission to the Department of Engineering.*
Sept. 26.	First Semester Begins in All Departments.
Nov. —	Thanksgiving Recess of three days, beginning Tuesday evening.
Dec. 21.	(Evening.) Holiday Vacation begins.
1906.	
Jan. 9.	Exercises resumed after Holiday Vacation.
Feb. 9.	(Evening.) First Semester Closes.
Feb. 9-10.	*Examination for Admission.*
Feb. 12.	Second Semester Begins.
April 13.	(Evening.) Recess begins, ending April 23 (evening).
June 21.	Commencement in All Departments.

his choice to continue in the civil engineering, the mechanical engineering, the electrical engineering, the chemical engineering, or the marine engineering course. The Order of Studies, given in §§ 118-129, is the one recommended by the Department; and the days and hours assigned to the different exercises each year in the Special Program are planned to avoid conflicts. A student can, however, deviate from this printed order, if his preparation for a given study meets the requirements prescribed by the instructor, and if he assumes all risk of interference of hours in subsequent semesters.

No marked distinction between first year, second year, etc., is made; but a student is recommended for a particular degree when he has successfully completed the requirements for the same, as laid down in §§ 130-136.

The academic year extends from the Tuesday preceding the last Wednesday in September to the Thursday preceding the last Wednesday in June (September 26, 1905, to June 21, 1906). The summer session, between the student's second and third, and third and fourth years, extends six weeks, from Monday following Commencement, June 26 to August 4, 1905. See §§ 119-129.

Copies of the University Calendar describing the different Departments, and containing a catalogue of all the students, will be mailed by James H. Wade, Secretary of the University, on request.

REQUIREMENTS FOR ADMISSION TO THE DEPARTMENT OF ENGINEERING

[For admission to advanced standing, see § 10-11.]
[For admission of students not candidates for a degree, see §12.]

1. Candidates for admission must be at least sixteen years of age, and must present satisfactory evidence of good moral character. They must bring credentials from their last instructor, or from the last institution with which they have been connected.

Board of Regents

JAMES B. ANGELL, LL.D.,
President.

		Term Expires
Hon. ARTHUR HILL,	*Saginaw,*	Dec. 31, 1905
Hon. CHARLES D. LAWTON,	*Lawton,*	" 1905
Hon. HENRY S. DEAN,	*Ann Arbor,*	" 1907
Hon. LEVI L. BARBOUR,	*Detroit,*	" 1907
Hon. FRANK W. FLETCHER,	*Alpena,*	" 1909
Hon. HENRY W. CAREY,	*Manistee,*	" 1909
Hon. LOYAL E. KNAPPEN,	*Grand Rapids,*	" 1911
Hon. PETER WHITE,	*Marquette,*	" 1911

JAMES H. WADE,
Secretary.

HARRISON SOULE,
Treasurer.

HON. PATRICK H. KELLEY,
Superintendent of Public Instruction.
(Office at Lansing.)

Department at his office, Room 4, in the Old Engineering Building.

Certificates from schools other than those officially examined and approved by the University, as specified in § 14, will not excuse applicants from admission examinations, unless such certificates be accompanied by satisfactory evidence that the school issuing them is equal in grade to the approved schools.

Students who have satisfied the requirements for admission to the Department of Literature, Science, and the Arts are admitted to this department, but must make up their deficiencies in *plane trigonometry* and *science,* if such deficiencies exist. The fifteen units required must include three units in English Composition and Literature, three units in Mathematics, one unit in Physics, and at least two units in Latin, French, or German. The other six units may be selected by the applicant from the list of requirements for admission to the Department of Literature, Science, and the Arts.

A unit is a subject of study pursued through a school year of thirty-six weeks, with not less than four recitation periods each week.

All entrance conditions must be removed by the beginning of the second year of residence.

The following requirements for admission will become effective in 1906.

Fifteen units are required for admission. A unit means the study of a subject four class periods a week for at least thirty-six weeks. Eleven and one-half units are prescribed. The other three and one-half units may be selected from those mentioned in the list designated below as Allowed. Only the number of units mentioned in connection with each subject will be accepted. In general, applicants will not be admitted with conditions in more than two units.

PRESCRIBED

- English, 3 units.
    - Grammar.
    - Composition.
    - Classics.
    - History of English Literature.
- Mathematics, 3½ units.
    - Algebra, through quadratics.
    - Geometry.
        - Plane.
        - Solid.
        - Spherical.
    - Trigonometry.
        - Plane.
- Physics, 1 unit.
- Chemistry, 1 unit.
- History, 1 unit.
    - United States History and Civil Government.

Latin. French. German.	One of these, 2 units.

ALLOWED

- English, 3 or 4 units.
- Mathematics, 3½ units, as above.
- Physics, 1 unit, as above.
- Chemistry, 1 unit, as above.
- Greek, 2 units.
- Latin, 2 units, as above.
- French, 2, 3, or 4 units.
- German, 2, 3, or 4 units.
- History, 1, 2, or 3 units.
- Physiography, ½, or 1 unit.
- Botany, 1 unit.
- Zoology, 1 unit.
- Biology, 1 unit.
- Drawing, ½ unit.
- Manual Training, ½ unit.

Under English is included Grammar, Composition, reading of English Classics, and History of English Literature. The History of English Literature may form part of the work of either the third or fourth year. Four units in English should always be presented whenever it is possible to do so.

Biology is defined as one-half year of Botany and one-half year of Zoology, hence it cannot be accepted from an applicant who offers at the same time either, or both, of those subjects.

Full preparation in Plane Trigonometry and Chemistry should be presented. The Summer Session of the University of Michigan affords facilities for doing this work between June twenty-sixth and August fourth, 1905.

The half unit allowed in Drawing and the half unit allowed in Manual Training must each cover at least 200 periods of work in an approved school.

Drawing.—One-half unit. Allowed. This work should cover:

(a) Exercises giving evidence of skill in the use of instruments and knowledge of materials used. These should consist mainly of the accurate geometrical construction of the more important plane curves, with simple problems involving tangents and normals to the same.

(b) Graded exercises in the orthographic projection of simple geometrical forms and working drawings of some of the more elementary constructions in wood and metal, all fully dimensioned, and in which the conventional signs are properly used.

(c) Exercises in line shading, shade lining, and cross-hatching, together with a reasonable skill in lettering.

Manual Training in Shop Work.—One-half unit. Allowed. If offered in wood work, it should cover a series of graded exercises in framing joints, dovetailing, and simple work in joinery, and cabinet making. This should be supplemented by a series of exercises in wood turning.

If offered in metal work, it should cover a series of graded exercises at the anvil and forge, including drawing down, upsetting, swaging, fullering, and welding. This may be supplemented with exercises in tool dressing and tempering, and in manipulating metals with the chisel and file.

The following is suggested as a desirable selection for the three and one-half units that are elective.

English, 1 unit.
History, 2 units.
Physiography, or
Drawing, ½ unit.

ADMISSION OF CANDIDATES FOR A DEGREE

2. The subjects on which applicants for admission to any of the courses leading to a degree in engineering will be examined are as follows:

English Composition and Literature.—The four units in English composition and literature should cover the following subjects:

Composition.—As preparation for this requirement, sustained and regular practice in writing is earnestly recommended. The student should prepare numerous written exercises throughout the four years of the high-school course, and a sufficient number of these exercises should be corrected by the teacher and revised by the student to secure the desired accuracy. The subjects upon which the student writes should not be drawn exclusively from literature; a considerable proportion of them should be so distributed as to give proper training in the various types of discourse, namely, description, narrative, argument, and exposition.

Rhetoric.—The student should be grounded in the essentials of rhetoric, but those principles should receive emphasis which are most likely to be of service to him in his practice in writing, such as the principles of sentential structure, paragraphing, and the outlining of the essay. The correction of stock specimens of bad English is not recommended, and will form no part of the entrance requirement.

Grammar.—The applicant should be prepared to state intelligently the essential principles of grammar and to explain the syntactical structure of any sentence encountered in his reading.

Reading of Classics.—The following books are recommended for this part of the requirement:

1905. For reading:—Shakespeare's *Merchant of Venice* and *Julius Caesar;* The Sir Roger de Coverley Papers in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Carlyle's *Essay on Burns;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.* For study and practice:—Shakespeare's *Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Speech on Conciliation with America;* Macaulay's *Essay on Addison* and *Life of Johnson.*

1906-1911. For reading, ten books selected from the following list:

Group I (two to be selected):—Shakespeare's *As You Like It, Henry V, Julius Caesar, The Merchant of Venice, Twelfth Night.* Group II (one to be selected):—Bacon's *Essays;* Bunyan's *The Pilgrim's Progress, Part I;* The Sir Roger de Coverley Papers in *The Spectator;* Franklin's *Autobiography.* Group III (one to be selected):—Chaucer's *Prologue;* Spenser's *Faerie Queene,* (selections); Pope's *The Rape of the Lock;* Goldsmith's *The Deserted Village;* Palgrave's *Golden Treasury (First Series) Books II and III,* with especial attention to Dryden, Collins, Gray, Cowper and Burns. Group IV (two to be selected):—Goldsmith's *The Vicar of Wakefield;* Scott's *Ivanhoe;* Scott's *Quentin Durward;* Hawthorne's *The House of the Seven Gables;* Thackeray's *Henry Esmond;* Mrs. Gaskell's *Cranford;* Dickens' *A Tale of Two Cities;* George Eliot's *Silas Marner;* Blackmore's *Lorna Doone.* Group V (two to be selected):—Irving's *Sketch Book;* Lamb's *Essays of Elia;* De

Quincey's *Joan of Arc* and *The English Mail Coach;* Carlyle's *Heroes and Hero Worship;* Emerson's *Essays* (Selected); Ruskin's *Sesame and Lillies.* Group VI (two to be selected):—Coleridge's *The Ancient Mariner;* Scott's *The Lady of the Lake;* Byron's *Mazeppa* and *The Prisoner of Chillon;* Palgrave's *Golden Treasury (First Series) Book IV,* with especial attention to Wordsworth, Keats and Shelley; Macaulay's *Lays of Ancient Rome;* Poe's *Poems;* Lowell's *The Vision of Sir Launfal;* Arnold's *Sohrab and Rustum;* Longfellow's *The Courtship of Miles Standship;* Tennyson's *Gareth and Lynette, Launcelot and Elaine,* and *The Passing of Arthur;* Browning's *Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervè Riel, Pheidippides.*

For study and practice:—Shakespeare's *Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Speech on Conciliation with America,* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson,* or Carlyle's *Essay on Burns.*

3. **English Literature.**—Preparation in this subject should include a systematic study of the outlines of English literary history. Due emphasis should be laid upon the division of the subject into periods; and the leading characteristics of each period should be studied and, as far as practicable, illustrated by the reading of representative authors. Any of the current manuals of English literature may serve as the basis of this part of the work, which should occupy the third or fourth year of the course. The historical study should, however, be associated as closely as possible with the reading of classics.

Applicants for examination will be asked to write two essays of not less than two hundred words each, one upon a subject drawn from the books in the foregoing list, and the other upon a subject drawn from experience or observation. The language of these essays must be grammatical and clear. The spelling, punctuation, and capitalizing must be correct. The applicant must show ability to discriminate in the use of words and to construct well-organized sentences and paragraphs. A topical outline should accompany each essay. A few questions will be asked upon the leading facts in the history of English Literature.

4. **Mathematics*.**—The three and one-half units in mathematics include algebra, geometry, and trignometry, as follows:—*Algebra.*—Fundamental Rules, Fractions, Simple Equations, Involution

---

*Students entering at the beginning of the second semester (February 12, 1906) should be prepared in the mathematics of the first semester in addition to the other requirements for admission.

and Evolution, the Theory of Indices, and Quadratic Equations, as given in Beman and Smith's Elements of Algebra, or an equivalent in other authors.

Geometry.—Plane, Solid, and Spherical Geometry as given in Beman and Smith's Plane and Solid Geometry, or an equivalent in other authors.

Trigonometry.—Plane Trigonometry as given in Crockett's or Wenthworth's Trigonometry, or an equivalent in other authors.

N. B.—It is very desirable that High Schools whose graduates are received on diploma arrange their courses so as to include a portion of both Algebra and Geometry in their last preparatory year. Students who do not come from diploma schools should take a similar review if they expect to succeed in the study of mathematics in the University.

5. **German, French, or Latin.**—Two units. Applicants may offer French, German, or Latin, one of these three languages being required. It is expected that at least two years will be given to preparation in the language offered. The requirements in each are as follows:

German.—The applicant should be able to pronounce German correctly and to take part with reasonable correctness and facility in a simple conversation upon some topic drawn from the applicant's preparatory work. He should also be thoroughly familiar with the every-day facts of the grammar, and be able to put illustrative English phrases into German, and to translate at sight a passage of fairly easy prose.

French.—The whole subject of French Grammar. The applicant will be expected to read at sight easy French, and to translate correctly into French simple English sentences. The first year ought to be spent chiefly on the grammar and easy reading; and the second devoted to reading good modern French, accompanied by grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; modern, rather than classic, dramas should be read.

Latin.—Jones's First Latin Book, or an equivalent amount in any other introductory text-book, four books of Cæsar's Gallic War, and one of the orations of Cicero.

Advanced credit may be secured for one or two years of German or French study in excess of the two years required for admission; and also if Latin and German or Latin and French are offered, advanced credit is given for the modern language, one year's study being deemed equivalent to Course 1, and a second year's study to Course 2. §§ 99-100.

6. **Physics.**—One unit. An amount represented by Carhart and Chute's High School Physics, to which one year should be devoted. Laboratory work in Physics is earnestly advised, though not required.

7. **Chemistry.**—One unit. The requirement is intended to cover one year's work. As a text-book, Freer's Elementary Chemistry, or an equivalent amount of work in Remsen's Introduction to the Study of Chemistry, is recommended. In either case the text should be accompanied by laboratory work.

8. **History.**—Two units. One year's work in General History as presented in such a work as Myers's General History, or one year's work in Mediæval and Modern History, and one year's work in United States History and Government, two years in all. Johnston's History of the United States, McLaughlin's History of the American Nation, Adams' European History, Coman and Kendall's History of England, Larned's History of England are suggested.

9. **Botany, Physical Geography, or Astronomy.**—The applicant should offer *one* of these subjects. The requirements, intended to cover a half-year's work in each subject, are as follows:

Botany.—Laboratory work for half a year with occasional recitations and review exercises. The method followed in Spalding's Introduction to Botany, or other modern text-book of similar plan and scope, may serve to indicate the kind of work desired.

Physiography.—Either Dryer's Lessons in Physical Geography or Davis's Physical Geography is recommended as a text-book.

Astronomy.—Newcomb and Holden's Astronomy, Briefer Course, Young's Elements of Astronomy, or an equivalent. A knowledge of the principal constellations is required.

ADMISSION TO ADVANCED STANDING

10. *a.* Graduates of the Department of Literature, Science, and the Arts of this University, or of any other reputable college, are admitted without examination to advanced standing as candidates for a degree in engineering, and are excused from a considerable portion of the general requirements (see § 131). The remaining requirements can be completed in two years, if the student takes as electives, while an undergraduate,* the mathematics required of engineering students (see § 102) and

---

*A student enrolled in the Department of Literature, Science, and the Arts, and desiring to elect any work in the Department of Engineering which is not printed in the Announcement of the former Department, must obtain written permission of his own Dean, have it approved by the Associate Dean of the Department of Engineering, and attach that paper to his election slip.

Course 4 in drawing (see § 109). A knowledge of differential and integral calculus, of theoretical mechanics, of elementary drawing, and of descriptive geometry, is needful for the advanced work.

b. Students who have completed at least one year's college work in an approved college, and who bring explicit and official certificates describing their course of study and scholarship, and testifying to their good character, are admitted to advanced standing without examination, except such as may be necessary to determine what credit they are to receive for work done in the college from which they have come.

c. Students who have not completed a year's college work in an approved college, but previously to entering this department of the University have pursued studies beyond those required for admission, may be admitted to advanced standing on passing the regular entrance examinations, and examinations in such undergraduate studies as they may ask to be credited with in advance.

Students entering at the beginning of the second semester, February 12, 1906, and expecting to join the first year's class, should be prepared in the mathematics of the first semester, mathematics 1, advanced algebra and analytic geometry (§ 102), in addition to the other requirements for admission.

11. Rules Relating to Admission to Advanced Standing

a. Any student, whether a candidate for a degree or not, who applies for advanced standing on the conditions stated in paragraphs (*b*) and (*c*) above, must present to the Associate Dean a statement showing the amount of work done in the subjects in which credit is asked.

b. The application for advanced standing should be made to the Associate Dean upon entering the Department. A blank form will be furnished for presentation to the professors in charge of the several subjects named in the blank, and each professor will indicate thereon the amount of credit in his subject to which the applicant is entitled.

Manual training work and drawing pursued in a high school will be recognized for advanced credit, if considered by the instructors in the Department of Engineering equivalent to the work given in that Department. Students desiring advanced standing in drawing must bring all drawings completed previous to entrance.

c. Credits must be secured before November 1 or (if the student be matriculated at the beginning of the second semester) before March 15.

d. No credit will be given for advanced standing after the dates named in (*c*).

e. An account once closed cannot be reopened without special permission of the Faculty. See § 96.

ADMISSION OF STUDENTS NOT CANDIDATES FOR A DEGREE

12. The term Special Student is applied to a person pursuing work in this Department who is not a candidate for a degree.

No one under twenty-one years of age will be admitted as a special student in this Department.

Practicing engineers, teachers, and other persons of mature years and recognized ability, may be given the courtesy of pursuing work as special students in this Department under the following conditions:—They shall be recommended by the heads of departments of instruction in which they wish to study, and be accepted by vote of the Faculty. They shall pay the usual fees of regular students.

The work of special students shall be under the direction of a committee of the Faculty.

A special student may become a candidate for a degree by vote of the Faculty, upon recommendation of the committee in charge of his work.

A student who is a candidate for a degree is not allowed to become a special student without permission of the Faculty previously obtained.

EXAMINATION FOR ADMISSION

13. The principal examinations for admission to the Department of Engineering will be held on Wednesday, Thursday, Friday, and Saturday, September 20-23, 1905. Another opportunity is afforded on February 9-10, 1906; but entrance in September is strongly advised. Applicants will not be examined at any other time except on payment of a special fee of *five dollars.*

As the examination begins at 10 A. M. on Wednesday, it will be necessary for all applicants for admission on examination to present their credentials to the Associate Dean of the Department, at his office, Room 4, in the Old Engineering Building, on Monday or Tuesday, September 18 or 19, between the hours of 9 and 5, and receive from him papers admitting to the examination.

The examinations in the several subjects will be in writing, and will be held in Tappan Hall in accordance with the schedule given below.

An applicant who fails in some part of the examination may, at the discretion of the Faculty, be admitted conditionally; but any condition so imposed must be removed at one of the two next regular examinations for admission, and no student who has an admission condi-

Department at his office, Room 4, in the Old Engineering Building.

Certificates from schools other than those officially examined and approved by the University, as specified in § 14, will not excuse applicants from admission examinations, unless such certificates be accompanied by satisfactory evidence that the school issuing them is equal in grade to the approved schools.

Students who have satisfied the requirements for admission to the Department of Literature, Science, and the Arts are admitted to this department, but must make up their deficiencies in *plane trigonometry* and *science,* if such deficiencies exist. The fifteen units required must include three units in English Composition and Literature, three units in Mathematics, one unit in Physics, and at least two units in Latin, French, or German. The other six units may be selected by the applicant from the list of requirements for admission to the Department of Literature, Science, and the Arts.

A unit is a subject of study pursued through a school year of thirty-six weeks, with not less than four recitation periods each week.

All entrance conditions must be removed by the beginning of the second year of residence.

The following requirements for admission will become effective in 1906.

Fifteen units are required for admission. A unit means the study of a subject four class periods a week for at least thirty-six weeks. Eleven and one-half units are prescribed. The other three and one-half units may be selected from those mentioned in the list designated below as Allowed. Only the number of units mentioned in connection with each subject will be accepted. In general, applicants will not be admitted with conditions in more than two units.

ADMISSION ON DIPLOMA

14. Students presenting graduation certificates from any of the schools officially approved by the Faculty of the Department of Literature, Science, and the Arts, signed by the superintendent or the principal of the school, are admitted without examination to the Department of Engineering. But if such certificate, though it might admit a student to the Department of Literature, Science, and the Arts, shows any deficiencies in the requirements for admission to the Department of Engineering, as for example, plane trigonometry or chemistry, such deficiencies must be made up, or substitutions secured at the time of entrance. Extra studies may be credited on advanced standing, if the subjects are taught in either of the two departments.

The certificate must state that the student has sustained his examinations in all the studies prescribed for admission to the Department of Engineering, or for the fifteen units of credit prescribed for admission to the Department of Literature, Science, and the Arts, and is recommended for admission to the University. It must be presented to the Associate Dean of the Department within a year and three months after graduation from the school, and the student must then begin his work.

The approved schools of the University of Michigan do not necessarily include those accredited to or affiliated with other Universities or Colleges.

Diplomas and sixty-count academic certificates issued by the Regents of the University of the State of New York are accepted by the Department of Engineering in place of examinations in all the subjects required for entrance which are covered by such credentials, provided not more than fifteen months have elapsed since the applicant graduated from school. A statement from the teacher, giving in detail the work done and the proficiency attained in these subjects, must be submitted by the holder of the credentials.

No other credentials, including pass-cards and certificates, issued by the Regents, are accepted, unless they are presented by the holder of a Regents' diploma or sixty-count academic certificate.

FEES AND EXPENSES

15. **Matriculation Fee.**—Every student before entering any department of the University is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars, is paid but once, and entitles the student to the privileges of permanent membership in the University.

16. **Annual Fee.**—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. The annual fee in the Department of Engineering is, for Michigan students, forty-five dollars; for all others, fifty-five dollars.

An annual fee of ten dollars is required of all graduates who are granted the privilege of pursuing studies for an advanced degree *in absentia.*

The Matriculation Fee and the Annual Fee must be paid *in advance.* No portion of the fees can be refunded, except by order of the Board of Regents, to students who leave the University, during the academic year. A by-law of the Board of Regents provides that no student or graduate shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

17. **Fee for Special Entrance Examination.**—An applicant for admission who desires to take the entrance examination at a time not announced is required to pay to the Treasurer a fee of five dollars before permission to take the examination can be granted him.

18. **Diploma Fee.**—The fee for the diploma given on graduation is ten dollars, and the by-laws of the Board of Regents prescribe that no person shall be recommended for a degree until he has paid all dues, including the fee for diploma.

19. Laboratory Fees.—The required Laboratory courses cost approximately as follows:—*Shop Practice.*—In the mechanical and electrical engineering courses, *thirty dollars;* in the civil engineering course, *ten dollars. Physical Laboratory.*—A charge of *one dollar* is made for a course requiring one exercise a week during one semester, and at the same rate for the longer courses. *Mechanical Laboratory.*—The charge for each course is *five dollars. Chemical Laboratory.*—Students who take laboratory courses in chemistry are required to pay for the materials and apparatus consumed by them. The average cost is about *ten dollars. Camp Fee.*—A fee of *ten dollars* is required of students who take the field work in camp.

The fee required for any course has to be paid before the work of the course is begun.

20. Summer Session Fee.—§ 91.

The total amount of fees paid to the University during the whole four years' course, for matriculation, incidental expenses, materials used, and diploma, is, for Michigan students, from $185 to $210; and for others, from $240 to $265, varying more or less according to the student's actual laboratory expenses.

21. Other Expenses.—There are no dormitories and no commons connected with the University. Students obtain board and lodging in private families. Room rent varies from seventy-five cents to two dollars a week for each student. Board varies from two dollars and a quarter to three dollars per week. Clubs are also formed in which the cost of board is somewhat reduced.

22. Annual Expenses.—The annual expenses of students, including clothing and incidentals, are, *on the average,* about three hundred and seventy dollars. By the practice of economy, it is possible to complete the four years for one thousand dollars. Not a few students are enabled to complete their course by withdrawing for a year or two to earn money to carry them through the remaining years.

The following actual case is given of the expenses of a Michigan student in his first year:

Matriculation Fee	**$10 00**
Annual fee	**45 00**
Shop-work fees, one course each semester	**10 00**
Drawing instruments	**20 00**
Books and stationery	**25 00**
Room and laundry, at $1.50 per week (might have been reduced by sharing room with another)	**55 00**
Board, 34 weeks, at $2.50	**85 00**
Clothes and incidentals	**30 00**
	$280 00

The matriculation fee is paid but once; the drawing instruments, if well selected, will be serviceable for a long time; railroad fares will vary, and are not included.

The annual expenses at the University, with ordinary economy, may be put at from $250 to $300.

FELLOWSHIP IN GAS ENGINEERING

23. The Michigan Gas Association continues for the year 1904-5 the support of the Fellowship in Gas Engineering which it has maintained since 1900-1. The annual stipend is five hundred dollars. By the terms of the gift the course of study is in charge of the heads of the departments of instruction in chemical engineering and mechanical engineering. The holder of the fellowship for the year 1904-5 was David Homer Clary, B.S.

SCHOLARSHIPS

24. There are no scholarships, at present, in the Department of Engineering.

There are, however, annually appointed about twelve assistants at salaries ranging from $100 to $200. For the most part these assistants are graduate students, a few being appointed from the senior class.

STUDENT EMPLOYMENT

25. The University does not undertake to furnish manual labor to students; yet a considerable number find opportunities in the city to meet a portion of their expenses. The Faculty suggests to such students that they do not attempt to carry the full amount of work outlined. Much more efficient work can be accomplished by taking a longer time to cover the course. Each student doing outside work should notify the Classification Committee of such fact at the time of classification.

The Students' Christian Association and the University Y. M. C. A. do what they can to aid those who are seeking employment.

SUGGESTIONS AND DIRECTIONS

26. Plan to reach Ann Arbor from three to ten days before September 26, 1905, if entering the first semester, or before February 12, 1906, if entering the second semester, in order that such preliminaries as finding a rooming and boarding place may be settled before the opening of the regular session.

Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University. The Students' Christian Association and the University Y. M. C. A. also actively interest themselves in assisting newcomers to find rooms and boarding places.

Applicants for admission on examination should present their credentials to the Associate Dean of the Department, at his office, Room 4, in the Old Engineering Building, on Monday or Tuesday, September 18 or 19, between the hours of 9 and 5, and receive from him papers admitting to the examination. The result of the examination may be learned at the Associate Dean's office Monday, September 25.

Applicants for admission on diploma (§ 14) should present their recommendation blanks to the Associate Dean not later than September 25, 1905.

When admitted, each student will be furnished with a blank containing directions for subsequent procedure.

RELATION OF STUDENTS TO THE CIVIL AUTHORITIES

27. Students are temporarily residents of the city, and, like all other residents, are amenable to the laws. If guilty of disorder or crime, they are liable to arrest, fine, and imprisonment. A rule of the University Senate provides that, if a student is arrested, or is convicted by the civil authorities, he shall be cited to appear before the Faculty of the department in which he is matriculated, and shall be liable to suspension or expulsion.

WITHDRAWAL FROM THE DEPARTMENT

28. Before withdrawing from class work, even temporarily, students should report to the Associate Dean.

Honorable Dismissal will be granted by the Associate Dean to students whose records are clear.

A statement of Voluntary Withdrawal will be granted by the Associate Dean to students whose records are not clear, and who are not subject to special discipline.

Those desiring to transfer to another department of the University should apply to the Associate Dean.

THE WORK OF THE DEPARTMENT

29. The studies pursued in the earlier part of the course are practically the same for all engineering students. They comprise, in *Mathematics,* advanced algebra, analytic geometry, and the elements of the differential and integral calculus; in *German, French,* and *Spanish,* the grammar, and reading of narrative prose and current scientific literature; in *English,* courses in composition and rhetoric; in *Physics,* mechanics, sound, light, heat, electricity, and magnetism; in *Chemistry,* the principles of inorganic chemistry; in *Drawing,* descriptive geometry; in *Shop Practice,* carpentry, pattern making, and forging.

For the order of studies, see § 117.

The more technical subjects follow in the latter part of the course. Some of these are of equal value to all engineering students, such as theoretical and applied mechanics, the strength and resistance of materials, and the metallurgy of engineering metals. Other subjects are adapted to the special requirements of the several courses.

For the order of studies, see §§ 118-129.

The general scope of the courses offered is shown in the following:

30. **English.**—The courses in English are primarily composition courses designed to develop in the student correctness, fluency,

and constructive power in the expression of his ideas. Course 1 is concerned with elementary principles and details of style. Course 2, Technical Journalism, is designed in response to a demand for technically trained men fitted, by practice in English, to enter the cataloguing departments of manufacturing concerns, and the editorial rooms of technical publications. The course will furnish practice in review and editorial writing, descriptive cataloguing, and kindred work. Course 3 will vary somewhat from year to year. For 1905-1906 the work will be based upon material drawn from the writings of eminent scientists.

Course 1 is required and must precede other courses. Courses 2 and 3 are elective. § 98.

NOTE.—Students in Course 1 who, during the first six weeks, show exceptional proficiency in English work will be excused altogether from the requirement of Course 1, and will be given work of higher grade.

31. **German, French, and Spanish.**—The aim of the instruction in German and French is to help the student to a reading and speaking knowledge of those languages. The elementary courses continue throughout one year, and their object is to familiarize the student with the forms and the constructions of the languages and to furnish him with abundant practice in reading and speaking them. As soon as practicable, English as a means of communication between instructor and student is banished from the class room, and the conversation conducted in the language taught. The vocabulary employed is, for the most part, that used in the ordinary intercourse of daily life.

The object of the courses of reading in scientific literature is to acquaint the student with the technical terms and special vocabularies of the various sciences, and thus enable him to consult books and periodicals bearing on his professional work with facility and profit. This reading covers a large range of scientific subjects, such as chemistry, physics (mechanics, sound, light, heat, electricity, and magnetism), geology, and mineralogy, as well as articles on steam and gas engines, hydraulics and hydraulic machinery, and mathematics. Many students read, besides the work assigned for the class room, scientific articles in the numerous German and French periodicals that are constantly coming to the University Library. The ability to read German and French scientific periodicals is of great value to the student in the prosecution of much of his work. In some of the more important courses in the Engineering Department a reading knowledge at least of both German and French is required of the students taking them.

Elective courses are offered for the accommodation and benefit of students who have the time and inclination to carry their language work beyond the limits of the required courses. Of the several electives offered, such courses are given as seem best suited to the needs of those applying for advanced work.

In addition to the extensive scientific vocabulary with which the student becomes acquainted, he is provided with practice in epistolary correspondence and is made familiar with the use of business and commercial forms.

The courses in Spanish are almost entirely conversational, and are offered chiefly to meet the demands of students looking forward to a professional career in countries where Spanish is the prevailing medium of communication, as in the Philippine Islands, the West Indies, Mexico, and the countries of Central and South America. The aim of the instruction in this department is to give the student acquaintance with and facility in the use of Spanish as it is spoken in the social and commercial world, the vocabulary chosen being that heard and used in ordinary daily life. These courses include as a part of their work considerable practice in business correspondence.

Opportunity for advanced work in Spanish is offered to students who desire to make themselves specially proficient in this language.

32. **Mathematics.**—The required work (including theoretical mechanics) is the same for all students of engineering, except those in chemical engineering, and extends through the first three years.

It is the object of this course not only to impart to the student the mathematical knowledge requisite for the study of the various branches of engineering, but to train his mind in the methods of precise reasoning and accustom him to the proper application of general principles to particular cases.

The first year is devoted to advanced algebra and to plane and solid analytical geometry. In the first semester of the second year the differential calculus and the beginning of the integral calculus are studied, special stress being laid on the geometrical applications, such as the discussion and tracing of curves. During the second semester of the second year and the first semester of the third year the further study and application of the calculus, including the elements of differential equations, are carried on in close connection with the study of theoretical mechanics, three hours a week being devoted to the latter subject and two hours to the calculus. The work in mechanics begins with kinematics, the simplest cases of motion in a straight line and in a curve being discussed and illustrated with numerous examples and problems, then follows a thorough course in statics where geometrical and analytical methods are used side by side. The third year is devoted to kinetics and the elements of differential equations. The student is introduced to the important ideas of work and energy and some of the more complicated problems regarding the action of forces are treated with special reference to their application in engineering.

In all these courses much time is devoted to the solution of problems in order to combine a fair knowledge of the elementary principles of higher mathematics with the necessary facility in applying these principles to concrete cases. The classes are divided into sections as small as practicable, so as to make it possible for the instructor to give his individual attention to the student. Models are used to assist the imagination both in geometry and in mechanics. § 102.

Students desiring to pursue their mathematical studies further will find a large list of electives among the courses in pure and applied mathematics offered in the Department of Literature, Science, and the Arts.

33. **Physics.**—The instruction in general physics covers a thorough course with the use of trigonometry and extends through an entire year. The first semetser is devoted to mechanics, sound, and light; the second to heat, electricity, and magnetism. The subjects are amply illustrated with appropriate experiments accompanying the lectures. Two additional courses in the laboratory introduce the student to quantitative methods in the study of physics, and prepare him for the more difficult and exacting work in electrical measurements. § 103.

34. **Chemistry.**—The course in the principles of chemistry, for all students of engineering, consists of lectures, with demonstrations and recitations. It covers briefly the facts regarding the metallic and non-metallic elements, and some attention is given to the method of scientific reasoning. Recent work in electro-chemistry is also touched upon. The students are prepared in this course to take up later the chemical processes involved in metallurgy. § 104.

35. **Drawing.**—A very complete course in mechanical drawing is given, embracing plane projection drawing, isometric drawing, descriptive geometry, and the elementary principles of lettering, coloring, and shading, with original problems executed in the drawing-room. Examples from numerical data are always given when suited to the conditions of the problem in hand. Students in mechanical engineering are required to sketch pieces of machinery, and afterward to make working drawings suitable for use in the shop. The plans of surveys, plane-table work, maps, designs in engineering construction, and the thesis drawings naturally come under this head. Instruction is also given in free-hand drawing, topographical drawing, ornamentation and lettering, shades and shadows, linear perspective, and drawing for stone cutting. The work in drawing occupies the student a part of almost every day throughout the course. § 109.

There are large and well-lighted drawing-rooms in the engineering buildings and in the engineering laboratory. There are also special rooms for blue-printing and a dark room for photography.

36. **Mechanical Practice and Shop Work.**—The aim of the instruction in this department is to make the student, as far as time will permit, acquainted with the best mechanical practice; the instructors in all practical work are men of wide experience, selected for their mechanical skill; and the department attempts to keep in touch with the most improved methods of mechanical construction. All courses are under the direction of the Superintendent of Shops, and instruction is given in the various branches by practical men, skilled in the craft which they teach.

The courses of instruction all begin with a systematic series of graded exercises, to give the student familiarity with the common tools used in the particular branch of work he is pursuing; and in connection with each course, the theory of the process is taught by lectures or by assigned reading. The student thus becomes fitted to execute an ordinary piece of mechanical work and at the same time acquires familiarity with sources of information bearing upon such work. At a later stage in the course the student is taught to apply the principles previously studied in the classroom, and to combine skill and knowledge in the transformation of crude materials into articles which have a market value. § 110.

In *Carpentry and Pattern Making,* after the student has completed the preliminary series of graded exercises, he is set to making and assembling the parts of some complete piece of carpenter or joiner work, and he then devotes the remainder of the time, about three-fifths of the whole, to pattern work. Special stress is laid upon this part of the course. The student shapes, forms, and builds up patterns for castings in iron and brass, allows for shrinkage, makes core boxes, and becomes as familiar as possible, in the time allowed, with all the details of practice. Each class, with the help of the instructors, is expected to make a full set of the patterns needed for the construction of some special piece of working machinery. The first course in carpentry is taken by all the engineering students.

In the *Foundry* the student learns to mould in green sand, in dry sand, and in loam, both for brass and for iron castings. Instruction is given in the making of cores for various purposes, and their use in the moulds; and in the art of selecting and mixing metals so as to produce the kind of material desired, careful attention being paid to the making of composition metals for specific purposes. Each student is required to take part in all of the work about the cupola and the brass furnaces, and to assume his share of their management during the periods of melting and casting.

In the *Forge Shop* the student is required to make forgings from a large variety of irons and steels. In this way he becomes familiar with different kinds and qualities of materials suited for blacksmith work; he learns how to heat, forge, anneal, harden, and temper such tools as are used in machine shops; and he also has practice in soldering and brazing. The object of the course is to enable the student to acquire a certain degree of skill in practice, and at the same time impart to him a knowledge of the principles governing such processes of forging as an engineer is likely to be called upon to direct. This work is required of all regular students.

In the *Machine Shop* the instruction is conducted on the same plan as in the pattern shop. On the completion of the series of graded exercises, the student begins the construction of parts of machines. Each class undertakes the building of one or more simple machines, or pieces of apparatus; and the work is planned in such a way as to give opportunity for learning general shop manipulation. Advanced students are also allowed to elect extra work and to assist the skilled workmen in the construction of larger machines.

A description of the engineering shops is given in § 77.

37. **Manual Training.**—In all the above-described courses advanced work can be taken by students who wish to become specially skilled in certain lines, or who desire to fit themselves for instructors in Manual Training Schools or in shops of that character.

38. **Surveying.** (*a*) *For Students in Civil Engineering.*—The course covers a full academic year, and includes text-book work, lectures, recitations, and field practice. The methods of surveying and computing used in laying out work are explained in detail; each student is required to make plats, maps, and the necessary calculations from actual surveys; and instruction is given in the proper care, use, and adjustments of instruments. There is an ample and varied supply of instruments for the use of students.

The classroom instruction embraces the following topics:—instruments and their adjustments; surveys for the inclosure and division of land; some account of the United States Land Survey; city surveys and town plats; surveys of lines of communication, such as roads, railways, and canals; hydrography; special surveys for various purposes of construction, such as laying out buildings, culverts, and abutments, and locating bridge piers; and, in general, the elements of all the ordinary operations to be expected in the professional practice of a civil engineer, but without including Land Surveying in the broad sense of the term. The principal text-books used are Johnson's Surveying, Raymond's Surveying, and Searle's Field Engineering. The more important works of reference are also easily accessible to the student. § 111.

The practical work outlined below, and carried on in the fall, early winter, and spring of each year, is intended to cover the elementary operations required in making surveys for engineering works, such as roads, streets, railways, canals, inclosures of land, public improvements, and the laying out of structures on the ground.

The steel tape practice includes linear measurements, ranging lines, measuring and laying-out angles, laying-out circular curves, and making the records and computations pertaining to such work. With the transit and steel tape the student has practice in reading angles; traverse surveying; laying out circular curves, simple and compound; and running straight lines. He is also required to keep the records and make the calculations connected with such work; to make plats, and to compute areas. The practical work with the level and rod includes simple leveling, check levels, and profile leveling, together with the necessary field notes and checks. The practice in topography embraces the use of the transit and stadia; plane-table work; and surveying with aid of the camera, including the development of negatives and the printing and mounting of photographs. From the field notes and photographs maps are made by the student. In this connection, also, the student has practice in making blue prints from negatives and from drawings.

During the first six weeks of the following summer vacation (between the third and fourth year) the class goes into camp in a favorable locality as a field party. A survey is made for some line of communication, usually a railroad, including exploration, preliminary and located lines, easements to curves, profile leveling, check levels, profile making, cross-section data, cross-sectioning, transfer of line to plugs near grade points, witnessing, and, in general, the preparation of the line for construction up to the point of beginning excavation. In this connection good field and office records are required; profiles and maps are made; and the necessary computations, including those for earthwork quantities, are worked out.

In addition to the railroad surveying, some other piece of field work is undertaken, the selection being made according to the fitness of the locality, the number and the previous experience of the members of the class, the time, and the weather, the purpose being to fix, by practical application, the principles learned from text-book, lectures, or previous experience. Within the past few years, work of the character indicated below has all been done, though not all in any one year:—small triangulation surveys, in which there is considerable reading of angles; compass surveys; shore-line surveys; surveys for special purposes, like town sites, bridge sites, cemeteries, or particular areas of unusual shape; resurveys of the United States Land Survey, including the finding and restoring of lost corners, and the subdivision of sections; contouring; hydrography; gauging of streams; leveling for special purposes, such as mill powers, lake levels, and the determination of the fall of streams; and, in general, any ordinary piece of field work, for which the locality chosen for the camp may afford favorable conditions.

The work in camp also includes office work along the various lines of field work, such as the computation of triangulations; reduction of careful measurements; calculation of earthwork, azimuth, areas, and elevations; mapping; platting; and profile-making. §§ 111, 125.

(*b*) *For Students in Mechanical and Chemical Engineering.*—The student in mechanical or in chemical engineering takes a short course in the use of instruments, which is nearly all practice. He is required to read angles with a transit; to make a traverse; to make steel-tape measurements; to do simple leveling; and to compute and plat an inclosure survey. The aim of the course is to cover the simple manipulations in the ordinary use of surveying instruments, and to qualify the student for such duties in this line as are apt to fall to the mechanical engineer, such as mapping an inclosure, staking out a building and fixing the levels for it, laying out foundations for machines or boilers and establishing the levels for them, lining up shafts, setting water power machinery, and preparing lines for transmission of power by wire-rope, compressed air, or water. § 111.

(*c*) *Other Courses.*—Courses in Land Surveying, the United States Land Survey, the Canadian Survey, and in other specialties are provided, if properly qualified persons present themselves in sufficient number to form classes.

39. **Geodesy.**—For students prepared to undertake the work a course is offered, comprising lectures, reference reading, and written class reports, on geodetic methods in the field with special reference to successful present-day practice. Some consideration is given to notable historical surveys, and constant use is made of reports and standard works of reference. § 111.

40. **Astronomy.**—Practice in the determination of time, latitude, and azimuth is offered to students in engineering. The ordinary problems necessary in field work are taken up by each student, who makes for himself a complete series of observations and reduces his own data. Observations are thus made with the sextant for time and latitude, using the stars and the sun; with the surveyor's transit for time, latitude, and azimuth; and with the meridian transit for time and latitude by Talcott's method. A thorough drill is given in the use of astronomical ephemerides and in the making of computations.

Other elective courses offer further instruction in Practical Astronomy, and in the Theory of Least Squares. This last should be taken by all students interested in experimental work. § 106.

41. **Highway Construction.**—A course of lectures and text-book work is given to students of civil engineering, on the construction and maintenance of roads, streets, pavements, and walks. References are made to existing examples and present practice. Byrne's Highway Construction is used as a text-book. § 111.

42. **Municipal Engineering.**—A course of lectures, prescribed reading, and recitations covers the special field of city engineering, points out its connection with, and dependence upon, other branches

of engineering work, and shows how to apply the principles of engineering to the modern problems arising in the building and improvement of cities, particular attention being given to sanitary questions. Among the topics treated are streets and their present uses, sewers, waterworks, public franchises, assessments, bridges, building inspection, fires, street lighting, street cleaning, and garbage disposal. The instruction is not intended to be of a technical character, but it aims to set forth the principles that should guide the city engineer in his relation to various matters of public concern, and to supplement and apply to this special field the instruction given in other courses. The course should not be taken by undergraduates before their last year of residence. § 112.

43. **Strength and Resistance of Materials.**—A course of recitations and lectures continuing through the first half-year is devoted to this subject, and is attended by all the engineering students except those pursuing the chemical engineering course. Simple and restrained beams and girders, shafts, pieces under tension, columns and struts are analyzed for different conditions of load; riveted work is computed; the action of the different materials under applied forces, the distribution of stress, and the proper proportions to be given to the different parts and details of structures in order that they may safely fulfil their several functions are carefully studied. Greene's Structural Mechanics is used as a text-book. § 112.

Tests of wood, iron, steel, cement, and other building materials are made in the Engineering Laboratory.

44. **Theory of Structures.**—Roof and bridge trusses, in wood and iron; arches, in wood, iron, and stone; trestles; brick and stone masonry; foundations; tunnels; and, in general, the whole theory of structures are discussed. In this course Rankine's Civil Engineering is used as a text-book, supplemented by full explanations, additional notes, lectures, examples, and problems, and illustrated by models, photographs, working drawings, and blue-prints. § 112.

45. **Graphics.**—A course of instruction extending through a year is given in the graphical analysis of roof and bridge trusses and arches under steady load, wind pressure, and moving loads. The student is made familiar with both the analytical and graphical methods of treatment, and thus possesses ready proof of the accuracy of his calculations. Greene's Roof Trusses, Bridge Trusses, and Arches are used as text-books. § 112.

The subject of mechanism, also, is given a graphical treatment. § 113.

46. **Hydraulics.**—The laws of the flow of water through orifices and pipes and over weirs; the gauging of streams and rivers; the designing of works for water supply, drainage and sewerage; the laying out of canals; and the subject of river and harbor improve-

ments are treated in this course. The text-book used is Merriman's Hydraulics. § 112.

The work in hydraulics is to be much extended in the near future, and will embrace the development of water supply and storage and hydraulic power plants. The new hydraulic laboratory with its equipment will afford abundant opportunity for practice in the measurement of flow under various conditions, the determination of hydraulic coefficients, and for original investigation. § 79.

47. **Machinery, Prime Movers, and Power Transmission.**—A course of instruction is given in mechanism, or the general principles of machinery, involving the study of gearing, screws, cranks, and levers, and the dynamics of machinery. In the study of prime movers, special attention is given to turbine and other water motors, and to steam engines. In the theory of machine construction, problems involving the strength and design of machines, and the materials used in their construction, and also involving the application of the principles of electricity, are studied at length in connection with such examples as illustrate the best practice. The instruction in power transmission covers the distribution of power by shafts, belts, rope, hydraulic and pneumatic transmission, and the arrangement of shafting and machinery in manufacturing establishments. Practical problems involving the strength of shafting, belting, and gearing are fully treated. Tests are made to determine the efficiency of machines and the value of lubricants. § 113.

48. **Design of Shop Machinery.**—The student is taught to design one or more of the standard machines used in shops. He is shown how to combine his theoretical and his practical knowledge so as to conform to the best mechanical practice. He designs one or more complete machines, and makes a detailed drawing of each part for shop use. The drawings that possess merit and are carefully worked out are subsequently used in the shops. Instruction is also given in blue-print work. The course is intended in every respect to represent, as far as possible, the operations of actual business. § 113.

49. **Designs in Engineering and Machine Construction.**—Contemporaneously with the study of theory, students are required to work out problems in design. They are furnished with the usual data for a design, and the kind of type of structure or machine is indicated. They are then expected to make the necessary calculations, paying particular attention to proportioning the different parts so as to secure strength, simplicity, and effect, and to present at a specified date complete working drawings, giving full details, accompanied by bills of materials, estimates, and specifications. § 113.

50. **Metallurgy.**—A course of instruction by lectures and recitations is given to mechanical and chemical engineering students

upon the subjects of fuel, refractory material, iron, and steel. The lectures are illustrated by charts and drawings of furnaces and appliances used, and by samples of furnace products. § 105. Mechanical engineering students are required to take metallurgy in the summer session between the third and fourth years. § 126.

51. **Mineralogy and Geology.**—The civil engineering students are required to take a brief course in mineralogy, which aims to make them acquainted with the physical and chemical properties, occurrence, and uses of the more common minerals, § 107, and a course in the elements of geology. § 108.

Advanced courses in both of these fields are open as electives.

52. **Thermodynamics.**—This course embraces the study of the principles governing the action of heat engines in general, hot-air and gas engines, steam turbines, air compressors, compressed-air engines, and refrigerating apparatus. § 113.

53. **Steam Engineering.**—The work in this branch covers the practical use of steam. Furnaces and boilers are studied with reference to proper combustion of fuel; to securing maximum evaporative efficiency; and to proportioning the parts for strength, durability, and accessibility for cleaning and repairs. The care and management of engines and boilers, both in use and out of use, are fully considered. A study is made of the principal steam pumps and pumping engines. Tests are made to determine the value of fuels, quality of steam, and the efficiency of furnaces, boilers, and engines. § 113.

54. **Gas Engines, Steam Turbines, Compressed Air, and Refrigeration.**—The theory is discussed under thermodynamics. Additional courses are given, covering the application of the theory, mechanical details of construction, and methods of operation. § 113.

55. **Heating and Ventilation.**—A course of lectures and recitations is given covering the theory of heat as applied in heating, the design and construction of hot air, direct and indirect steam, hot water, and fan systems of heating. Plans are made for different systems, and plants inspected. § 113.

56. **Primary and Storage Batteries.**—Two courses are given combining theory and experimental work, and dealing with the calculation and measurement of electromotive forces, polarization, internal resistance, and efficiency of cells. Several types of storage cells are in constant use. The practical use of batteries in electrical engineering is considered in the courses in distribution of electricity, and telephony and telegraphy. See also the courses in electrical measurements. § 114.

57. **Electrical Measurements.**—This course extends through an entire year, and is devoted to practical work in the laboratory

with the most modern apparatus. In addition to exact methods of measuring resistances, electromotive forces, and currents, it includes the calibration of the measuring instruments employed, the determination of capacity in absolute measure, the measurement of inductances, and the determination of the hysteresis curves of iron and steel. § 114.

58. **Dynamo Electric Machinery.** (*a*) ***Direct Current Machines.***—The time given to this course is about equally divided between the study of the theory of generators and motors, and the determination in the electrical engineering laboratory of characteristic curves, of the series turns required to compound for constant potential, and of the efficiency of generators and motors. Visits will be made to neighboring power stations. § 114.

(*b*) *Alternating Current Machinery.*—Two courses are given in which, to the theoretical study of the subject, is added laboratory work with alternators, transformers, synchronous and induction motors, either single phase or polyphase, and the transmission of power between generators and motors, especially two and three phase systems, and the conversion of one into the other. Visits will be made to neighboring power stations. § 114.

59. **Design of Electrical Machinery.**—Two courses in electrical design give the fundamental principles and illustrate them by numerical calculations of electromagnets, of direct current generators and motors, alternators, transformers, and induction motors. The lecture courses are supplemented by exercises in drawing in which each student makes working drawings to accompany his own design. Highly satisfactory transformers, two-phase and three-phase generators, and induction motors have been built by electrical engineering students in the engineering shops. § 114.

60. **Distribution of Electricity.**—This course deals with systems of electrical conductors for the distribution of current for lighting and power, and with the electrical engineering problems which are involved in the distribution of electricity. § 114.

61. **Telephony and Telegraphy.**—This course includes class and laboratory instruction. Visits will be made to neighboring telephone exchanges to inspect different systems. Ample laboratory facilities are provided in the new engineering building occupied in 1904. § 114.

62. **Industrial Chemistry.**—Under this head come those courses which treat of chemical processes on a manufacturing scale. The chief subjects are:—Fuels; gas; iron and steel; water; the acid, alkali, cement, and glass industries; by-products from coal and wood; starch, glucose, and sugar; fermentation and distillation; fats, oils, and soaps; bleaching and dyeing; tanning; the paper manufacture, etc. § 104.

63. **Structural Arrangements of Ships.**—This course is devoted to the discussion of the practical details relating to the various parts of a ship's structure, such as keels, framing, plating, preparation of working drawings, ordering material, general methods of construction, and Classification Societies' rules. § 116.

64. **Ship Calculations.**—This course consists of a series of lectures and recitations upon the displacement and buoyancy of ships, and includes discussions of rules for determining areas, volumes, center of buoyancy, metacenters, change of trim, tonnage, freeboard, etc. The theory and use of the planimeter and integrator are also discussed. § 116.

65. **Strength of Ships.**—This course includes a general discussion upon the question of strength and resistance of materials, methods of obtaining curves of weights, buoyancy, shearing force, and bending moment upon ships under various conditions of wave support; general and local stresses, and strength of riveted joints. § 116.

66. **Stability of Ships.**—A series of lectures and recitations is devoted to the various methods of obtaining curves of stability, statical and dynamical, of vessels of different types under varying conditions. The geometrical properties of the surface of buoyancy, flotation, etc., are discussed, together with problems relating to the rolling of vessels in still water and in waves. Methods of reducing rolling are illustrated by models in the experimental tank. § 116.

67. **Resistance and Propulsion of Ships.**—Under this heading are treated all questions relating to the resistance of vessels to motion. Surface friction, wave making, eddy resistance, Froude's law of comparison, progressive trials, etc., are discussed and illustrated in the experimental tank. Investigations of the action of various forms of propellers, and the analysis of their effect upon the resistance of the vessel are also discussed. § 116.

68. **Ship and Engine Specifications.**—A series of lectures is given which embraces a general discussion of the preparation of specifications. Methods of estimating weights and costs; arrangements of pumping, heating, and ventilation; auxiliary machinery, etc., are also included. In connection with the design of a ship or machinery installation each student is required to prepare a general specification. § 116.

69. **Practical Shipbuilding.**—A course of lectures is given on arrangements of shipyards, methods and sequence of work, preparation of working plans, specifications, etc. Methods of estimating weights and costs, arrangements for pumping, heating, and ventilation are also discussed. § 116.

70. **Mould Loft Work.**—The course in this subject includes the laying off and fairing a set of lines of the full sized ships; method of obtaining bevels; expansion of various parts of the structure; laying off plating, and preparation of moulds. § 116.

71. **Marine Engineering.**—Under this heading are treated the theoretical and practical considerations governing the design and construction of marine engines and boilers of various types. Details of construction, weight, and space occupied, vibrations, and methods of balancing engines, are also treated, together with the design and arrangement of auxiliary machinery. § 116.

72. **Drawing and Design.**—The above courses are accompanied by work in the drawing room, which will include:—Laying off and fairing a set of lines from given offsets; calculations of displacement, center of buoyancy, etc., and plotting results; construction of capacity curves; calculation of change of trim and curves connected therewith; of launching; of strength and determination of curves of weight, buoyancy, shearing forces and bending moments; calculation of stresses; of curves of stability.

Later, the student will work out a design for a vessel to fulfil given conditions, as, for instance, a fast passenger or cargo steamer, cruiser, battleship, torpedo boat, or steam yacht, and will prepare the lines, general arrangement, midship section, and all calculations connected with the above, and if time permit, a complete set of working plans, together with an order form and specification.

In marine engine drawing the student will design a marine boiler with all details, and also a marine engine with as many of the detail plans as possible, and will make all necessary calculations. § 116.

Visits of Inspection. See § 74.

Experimental Tank. See § 81.

FACILITIES FOR INSTRUCTION

73. The collections for illustrating the instruction given comprise models, drawings, photographs, lithographs, and blue prints, representing trusses, arches, and details of construction in iron, wood, and stone; sections of valves, pumps, and injectors; indicators and gauges; working models in various lines and full-sized machines; working drawings of bridges, engines, dynamos, etc. These collections are receiving additions from year to year, by gift and purchase, and are invaluable to the students.

74. **Visits of Inspection.**—As often as practicable, visits are paid to neighboring manufacturing establishments, to electric light and electric power stations, and to points of engineering interest, for the purpose of acquiring a knowledge of the methods employed in building, in the construction of bridges, machinery, and ships, and the best practice in electrical manufacturing and engineering on a large scale.

Tests of engines and boilers, and of machinery in general, will be made on request, and the profit of such work devoted to extending the facilities of the engineering laboratory. The data of all experiments and tests made are kept in the laboratory records. Tests of materials are also conducted for private parties, and reported upon when desired.

All the laboratory work is on a practical basis, and is done as nearly as possible as it would be done in any well-arranged manufacturing establishment. There is a metallurgical laboratory connected with the chemical laboratory, supplied with assay furnaces and other appliances. The latest and best books on professional subjects are added yearly to the library, where they are accessible to all; and frequent references are made to them in the class room as the various subjects are brought forward.

75. **Physical Laboratory.**—The basement of the physical laboratory is devoted to the experimental work in heat, electricity, and magnetism. It contains about 4,500 square feet of floor space and is divided into twelve rooms. These include a photometry room with blackened walls for testing the candle power of incandescent and arc electric lamps, and a storage battery room.

On the first floor are two lecture rooms, one seating 120 and the other 400 students. There are besides two apparatus rooms and three rooms for general laboratory purposes. The third floor contains another general laboratory, one class room, and several smaller rooms for the practical work in sound, light, and electrochemistry.

The laboratory is supplied with the apparatus from the best American and European makers. In sound, it includes tuning forks and resonators from Koenig, of Paris; in light, a spectrometer with 12-inch divided circle, an opthalmo-spectroscope from the Geneva Society, an optical bench, with accessories, from Duboscq, a Zeiss focometer, spectrometer, and interferometer, and a polariscope from Schmidt and Haensch, and apparatus suitable for work in the ultra-violet and infra-red spectra.

In heat, mention may be made of standard thermometers, including a set from Haak reading to hundredths of a degree and covering the scale from—5°C. to 105°C., a platinum-rhodium couple, certified by the Reichsanstalt, and accessory apparatus from Siemens and Halske for the measurement of high temperatures, air thermometers, Clement and Desormes' apparatus for measuring the ratio of the two specific heats of a gas, and Regnault's vapor pressure apparatus.

The work in the laboratory is entirely quantitative in character, but provision has been made for illustrating the general principles and laws of physics in the lecture courses.

76. Chemical Laboratories.—The chemical laboratories provide for classes in general, analytical, organic, and physical chemistry, in pharmacy, in chemical technology, and in metallurgical assaying. They also provide for original research in the several branches of chemical science and for independent investigations in technology. In the course of the year, classes are formed in forty-six distinct courses of study. In the greater number of these courses the method of work combines training in laboratory operations with instruction by lectures and conference, these methods being united in one course.

The chemical building contains in all about 37,000 square feet of floor space. Besides the rooms for recitations, storage, administration, etc., the laboratories for students have an area of about 25,000 square feet.

The laboratory of general chemistry is separately organized. Courses in elementary inorganic chemistry, as well as in physical chemistry and the advanced branches of the science are offered; research work both in inorganic and organic general chemistry is also arranged for a limited number of students. Modern apparatus is on hand for all the varieties of work that are liable to be undertaken, and a well-equipped balance room is provided.

The laboratories of analytical chemistry, organic chemistry, pharmacy, and chemical technology are carried on together. There are separate work rooms for qualitative analysis, quantitative analysis, iron and steel analysis, electrolytic work, pharmaceutical proparations, organic preparations, organic analysis, physiological chemistry, and assaying of ores, as well as rooms for the weighing-balances and instruments of precision, for gas analysis, and for optical work. The rooms fitted up for chemical technology in various industrial branches have nearly 3,000 square feet of floor space. There are eleven separate rooms for original research, two lecture rooms, and two recitation rooms. In the ventilation of the work rooms the supply of fresh air is enforced by driving fans, and the removal of foul air is effected by draught flues and by electric-motor fans, with which, also, working hoods are connected.

The chemical laboratories are open throughout the college year to all students of the University, and are regularly used by the several departments. They are also open to any person who wishes to pursue special studies therein, provided he complies with the conditions for admission to that department of the University to which the desired special studies properly belong.

Over three hundred students are engaged in these laboratories at the same time, each at a table provided for one worker. During the year from 600 to 700 students complete from one to five courses of study each in the various branches of chemistry. The students engage in chemical work as it is needful for their different purposes —the pursuit of science, or the preparation for teaching, for the several professions applying chemistry, and for the various chemical arts and industries.

77. **Engineering Shops.**—The engineering shops are in a group of connected buildings, and occupy about 30,000 square feet of floor space.

The *Carpenter and Pattern Shop*, 40 by 127 feet, is equipped with the tools and machinery usually found in a first-lass establishment.

One end of the shop contains work-benches and tools needed for hand work in carpentry. The other end contains benches and tools specially adapted for pattern-making. The central portion is occupied by a good variety of wood-working machinery. A lumber and pattern loft, 40 by 120 feet, contains blue-printing apparatus, materials, and a large collection of patterns made by students.

The *Foundry*, 30 by 120 feet, is equipped with cupola and brass furnaces, core-ovens, elevator, crane, blowers, and a supply of small tools and flasks suitable for the kinds of work done. From one to two tons of castings are made weekly.

The *Forge Shop*, 40 by 127 feet, contains twenty-eight down draft forges together with anvils and tools for doing a variety of work in hand forging; benches, vises and tools for chipping and filing metals; and machines for punching, shearing, drilling, turning and planing operations. Blast is supplied to the fires and gases removed by large power-driven fans, which thoroughly ventilate and purify the atmosphere of the room.

The *Machine Shop*, 40 by 127 feet, contains an assortment of engine-lathes, speed-lathes, turret-lathes, planers, shapers, milling

machines, grinding machines, and various tools for working in metal. A well-equipped tool-room is connected with this shop.

In connection with each of these four shops there is a lecture and quiz room, in which are collected models, drawings, charts, diagrams, and books, which are used in the courses of instruction.

The *Instrument Shop*, 20 by 32 feet, contains a number of small lathes and drills, and the tools needed in constructing scientific and other apparatus.

The *Drawing Room*, 32 by 54 feet, is fitted with improved drawing-tables, lockers, and drawing cases for use with classes in workshop drawing and machine design.

The central portion of the building, 32 by 54 feet, contains in the basement a well-ventilated lavatory and locker-room, and on the first floor an engine room with a 10 x 30 Reynolds-Corliss engine, a store-room, and the superintendent's office.

A good part of the equipment has been designed and built in the shops. New machinery is added from time to time by construction or purchase. The entire equipment is used in instructing engineering and other students in the use of tools for working in wood and in metals, and in modern workshop methods. Opportunity is afforded to become familiar with the more common materials and forms of construction used in engineering structures, buildings, and machinery. In all work an effort is made to follow the practice of the best shops.

78. **Mechanical Engineering Laboratory.**—This laboratory is devoted to experimental work in connection with the testing of engines, boilers, pumps, indicators, belting, gearing, lubricants, and strength of materials, and to such original work as can be undertaken with advantage. The work also extends to the testing of engines, boilers, and water-wheels of neighboring mills and electric plants. The Knowles and the Gordon pumping engines at the City Water Works have been fitted up by the company with special reference to the convenience of engineering students in making tests.

The steam laboratory is located in the new engineering building. It occupies a space 60 by 60 feet on the first and second floors of the north wing, with a sub-basement 42 by 17 feet and a mezzanine floor 23 by 36 feet. Adjoining the steam laboratory is a boiler room 34 by 34 feet, having a gallery eight feet wide, on the second floor, and a gallery 12 by 18 feet wide on the third floor.

On the first floor of the steam laboratory there is installed one

150 h. p. Armington & Sims engine; a 75 h. p. Westinghouse compound engine; a 30 h. p. De Laval steam turbine; a Worthington jet condenser; a Wheeler surface condenser with Edwards air pump and a 5-inch centrifugal circulating pump. The second floor of the steam laboratory contains a combined automatic and throttling engine of a high speed type; a Fairbanks and Morse gas engine; a Meitz-Weiss kerosene engine; an Otto gas engine; a Franklin air cooled automobile engine; an Olds automobile engine; a Blake air compressor; a Westinghouse air brake outfit; a large wet gas meter; and a small throttling engine.

The boiler room is provided with a high pressure Stirling boiler with a Buffalo Forge Co. direct steam driven, induced draft fan, a Cochrane feed water heater, econometer, and all neccessary scales and tanks for boiler testing. On the third floor gallery of the boiler room is located a complete plant for the testing of direct steam radiators and pipe coverings. On the mezzanine floor of the steam laboratory there is installed a complete equipment for testing boiler feed pumps and other small pumps. This plant consists of a large and a small pressure tank; a Wheeler surface condenser with a Blake air pump; two 50,000 pound scales with steel weighing tanks, each holding 600 cubic feet of water; and a number of boiler feed pumps.

In addition to the larger equipment enumerated above the steam laboratory is equipped with all the necessary accessory equipment which includes special apparatus for testing pressure and vacuum gauges; a special apparatus for testing indicators; apparatus for testing thermometers, both high and low pressure; electrical and mercury pyrometers; steam and gas indicators; thermometers; tachometers; standard weights; special plant for testing injectors; rotary and centrifugal pumps; water meters; water motors, including special Universal motor built for testing any form of bucket; and all necessary weighing tanks and scales.

On the second floor of the steam laboratory a small room has been provided for such chemical work as is ordinarily used in mechanical engineering. On the west side of the ground floor of the east wing a space 22 by 41 feet has been set apart for testing the physical properties of materials, and there is installed in this room a 100,000 pound Olsen testing machine. An adjoining room 22 by 24 feet is used as a cement testing laboratory, in which is installed an Olsen cement testing machine.

On the third floor of the north wing the 100-inch electrically driven ventilating fan for this wing has been installed especiallly for the investigation of fan heating problems. It is provided with a Reeves Transmission by meanse of which the speed can be varied from 100 to 400 revolutions per minute. The heaters are so arranged that any number of rows of heating pipes up to thirty-two can be had on either the suction or the blast side of the fan.

This fan is also provided with a discharge pipe leading into the mould loft by means of which experiments can be made to determine air pressures and resistances on bodies of different forms at velocities varying from 15 to 100 feet per second. This apparatus, while available for heating purposes, was designed with especial reference to experimental work. It was donated by the Buffalo Forge Co., Buffalo, N. Y., who have spared neither pains nor expense in its installation.

The two 140-inch electrically driven ventilating fans in the south and east wings, installed by the Buffalo Forge Co., are also adapted for experimental work.

79. **The Hydraulic Laboratory.**—This laboratory occupies a space of 40 by 60 feet on the first and second floors of the north wing adjoining the steam laboratories. A canal four feet wide, fourteen feet six inches deep, and forty feet long extends across the middle of the laboratory. Water enters this canal from the naval tank and is returned to the tank by a centrifugal pump in a well at the far end of the canal. This canal is provided with bulkheads, screens and weirs, and is arranged for testing the flow of water over weirs and through nozzles up to a capacity of twenty cubic feet per second. The bulkhead between the naval tank and the canal is arranged for weirs and nozzles so that tests may be made for flow from a still water basin as well as in a running stream. The naval tank itself is arranged for bulkheads dividing it into three basins, each one hundred feet long. By means of a sluice in the bottom of the tank these basins can be connected to the hydraulic canal and the centrifugal pump, so that water can be pumped from one of the basins and delivered into either of the others. The laboratory will also have two weighing tanks for calibrating purposes, each holding six hundred cubic feet. A 36-inch pressure tank, designed for 250 pounds pressure, extends through two stories. This is supplied by a Duplex pump of one million gallons capacity, and affords means for nozzle and motor experiments under high heads. An open tank eight feet wide, thirty-two feet long and five feet deep rests on a platform near the ceiling of the second floor. The centrifugal pump supplies this tank, which serves as a forebay for water wheel tests under heads up to about twenty-five feet.

80. **Electrical Engineering Laboratory.**—A new laboratory, exclusively for electrical engineering, occupies the basement of the south wing of the new Engineering Building. The laboratory has a total area of about 5,000 square feet. It includes two large rooms for dynamo-electric machinery, one for direct-current apparatus, 54 by 29 feet, the other for alternating-current apparatus, 54 by 27 feet. There is also one large room for telegraph and telephone engineering, 35 by 19 feet, three rooms, each about 20 feet square, for research laboratories, and smaller rooms for storage battery, cali-

bration of instruments, photometry, photography, etc., besides the office and private laboratory of the professor in charge.

In the dynamo room are two 10-light arc machines, two constant potential machines, and a 33 K. W. composite wound alternator made for the University by the Fort Wayne Electrical Corporation, and an 8 K. W. rotating convertor. These are all run by electric motors carying from 2½ to 50 horse-power. In addition, two small alternators of 60 and 125 cycles, respectively, are used for two-phase and three-phase experimental work. Arc lamps, banks of incandescent lamps, ammeters, voltmeters, wattmeters, galvanometers, electrodynamometers, resistances, rheostats, transformers, and a large storage battery complete the equipment. The transformers include a set for conversion from two-phase to three-phase transmission and the reverse. A well equipped photometric room adjoins the dynamo room.

The laboratory for telegraphy and telephony is equipped with apparatus to illustrate commercial systems, including apparatus for duplex and quadruplex telegraphy, and various systems of telephone exchanges.

During the summer of 1904 several machines of the latest types were added to the present dynamos. Considerable auxiliary apparatus was also purchased. The increase in equipment, together with the enlarged laboratory space, will improve the efficiency of all the courses offered by the department.

The University lighting plant, consisting of one 200 K. W. and two 75 K. W. Thompson-Ryan generators, is available for instruction in the department. The 200 K. W. machine is directly connected to a compound engine run at a speed of 180 revolutions a minute. The two 75 K. W. machines are connected by the Arnold system to two 15 by 14 engines and run at a speed of 250 revolutions a minute. The system is a 220-volt one throughout, with both incandescent and arc lamps (two in a series) on the same circuits. All the feeders and mains are underground, except those running from the central plant to the University Hospital, which is supplied with current from the central plant on the campus by means of heavy cables and a "booster."

The Arnold system permits of connecting either of the pair of dynamos to either engine, or of disconnecting either so that it may be tested for efficiency by purely electrical methods. A large number of motors, varying in capacity from 1 to 50 H. P., are in service and are available for testing purposes.

81. **Marine Engineering Laboratory.**—In the basement of the New Engineering Building the east wing is devoted to the experimental tank. This tank is 300 feet long, 22 feet wide, with a depth of water of 10 feet. At the south end is a model room and work shop for the purpose of making models of vessels. The models to be tested are from twelve to fourteen feet in length. The tank is

spanned by a traveling truck which is driven by a motor and can be run at any desired speed. Upon this truck are mounted the dynamometers for measuring the resistance of the models of various forms at different speeds.

Experiments upon ships' forms will be conducted in a systematic manner and the results of such experiments will give the student an intelligent idea as to the capabilities of any given form.

The action of bilge keels upon the rolling of vessels, and upon the speed, will also be subject to investigation. It is proposed in the near future to install special apparatus for the investigation of the action and properties of screw propellers.

82. **Mould Loft.**—The mould loft is situated on the top floor of the north wing of the Engineering Building, occupying a floor space of 3,600 square feet. The loft is fitted with the usual equipment, such as battens, bevel boards, benches for making moulds, etc.

Students are also allowed the use of the mould loft for the construction of small vessels. For this purpose steam boxes and bending slabs are provided. § 70.

83. **Astronomical Observatory.**—The observatory is known as the Detroit Observatory, having been founded through the liberality of citizens of Detroit. Valuable additions and improvements have been made by contributions from several sources. The building consists of a main part, with a movable dome, and two wings. The meridian circle in the east wing was constructed by Pistor & Martins, of Berlin. In the main part are mounted clocks by Tiede & Howard. The west wing contains the observatory library, which connects with the residence of the Director. The refracting telescope, mounted in the dome, has an object glass thirteen inches in diameter. It was constructed by the late Henry Fitz, of New York.

A small observatory near the main building is used in the work of instruction. It contains an equatorial telescope of six inches aperture, and a transit instrument of three inches aperture, with zenith telescope attachment.

84. **Mineralogical Laboratory.**—This laboratory occupies the basement of Tappan Hall. It includes one room, 60 by 23 feet, used for general laboratory purposes; another, 40 by 23 feet, is devoted to work in blowpipe methods; while a third room, 60 by 23 feet, contains the mineralogical collections. There are also two dark rooms used for goniometric measurements.

The general laboratory is well equipped with crystal models, natural crystals, and working collections for the rapid determination of minerals, principally by means of the physical properties, and is also equipped with goniometers and polarization microscopes. The blowpipe laboratory possesses ample facilities for the carrying out of blowpipe tests, both upon plaster tablets and charcoal, as well as all other chemical reactions useful in the determination of minerals. The mineralogical collections include the Lederer, Garringer, and Rominger collections.

85. **Geological Laboratory.**—Opportunity for practical work in geology is provided in rooms set apart for this use in the Museum building. The rooms are furnished with microscopes, photographic instruments, cutting and polishing lathes, and other apparatus for the preparation of specimens. Special encouragement and assistance are given to students wishing to carry on original investigations.

86. **The Libraries.**—The GENERAL LIBRARY contains about 150,000 volumes. Its reading room, seating about 300 persons, is open from eight in the morning till ten at night every day throughout the academic year, excepting Sundays and important legal holidays.

The ENGINEERING LIBRARY, comprising about 3,000 volumes, is now housed in the new engineering building, where the students of the Department of Engineering have direct access to the shelves. Over one-half of the collection consists of files of professional periodicals and proceedings of engineering societies.

87. **The Engineering Society.**—Several organizations of students are maintained, aside from the usual literary societies, for the reading of papers and holding discussions in various scientific lines. The Engineering Society, composed of and officered by students of this department, holds meetings, at which papers of technical interest are read, and reports made upon observations and experiments. A reading room is maintained by the society, accessible to all students of the department. Many engineers of prominence have spoken before the Society in past years. A journal, called the Michigan Technic, containing papers read before the Society, abstracts of theses, contributed articles from alumni, and others matters of professional interest, is published by the students semi-annually.

SUMMER SESSION

88. The Summer Session of the University of Michigan will open June 26, 1905. Work will be given in the Department of Literature, Science, and the Arts, Engineering, Medicine and Surgery, and Law. The session will close August 4, in all departments except in the Department of Law, in which work will continue until August 18. A special Announcement can be had by addressing Mr. James H. Wade, Secretary of the University.

89. **Courses Offered.**—In the Department of Literature, Science, and the Arts, the Summer Session affords opportunity for study in languages, history, mathematics and the sciences. In the Department of Engineering, all of the courses in shop-practice are offered, and a part only of those in drawing, surveying, civil engineering, mechanical engineering, electrical engineering, and metallurgy. Students who wish to review studies, or make up deficiencies, preparatory to presenting themselves for admission to the Department of Engineering, will find courses directly adapted to meet their wants.

90. **Courses Required.**—Engineering students are required to take certain prescribed courses during the Summer Session between their second and third, and third and fourth years. §§ 119-123, 125-129.

91. **Tuition Fees.**—In the Department of Literature, Science, and the Arts, and of Engineering, the tuition fee is $15, regardless of the number of courses taken, except that no tuition fee will be required of students of the Department of Engineering who are taking the work prescribed by the department for the Summer Session between the second and third, and third and fourth years. §§ 119-123, 125-129.

Students entitled to exemption from payment of the Summer Session fee must procure a certificate from the Secretary of the Department of Engineering, to be presented to the Chairman of the Executive Committee of the Summer Session at the time of registration, and to the instructors in order to gain admission to their classes.

92. **Other Laboratories.**—For a full account of all the laboratories, other than those described in this Announcement, which appertain to engineering, and their various resources, as also of the University collections for the study of art, archæology, ethnology, mineralogy, paleontology, systematic zoology, etc., consult the annual Calendar, which may be had gratis on application to Mr. James H. Wade, Secretary of the University.

93. **University Organizations.**—An attractive series of lectures and musical entertainments is provided each year at a low price by the Students' Lecture Association. The Choral Union is an organization of students and others for the study and practice of choral music. A course of concerts and a festival of three days in May are announced under its auspices each year.

The Oratorical Association fosters an interest in oratory, and its members have been remarkably successful in recent contests.

94. **Facilities for Physical Culture.**—The University is provided with excellent gymnasiums. The Waterman Gymnasium for men has cost about $65,000. The main floor, which is a rectangle

with truncated corners and dimensions of 150 by 90 feet, is well equipped with the various kinds of apparatus usually found in the best modern gymnasiums. A number of smaller rooms are devoted to administration, fencing, boxing, and other special purposes, while the basement is given up to baths and lockers. The main hall is lighted in the daytime by means of a large skylight 60 feet above the floor, and in the evening by electricity. A gallery makes room for an elliptical running-track 375 feet in length.

In the conduct of the gymnasium the aim is not so much the development of a few gymnastic experts as the provision of wholesome physical exercise for the many. The facilities of the building, including physical examinations and instruction, are free to all students, the only charge being a rental of $2 a year for a locker. *Attendance twice a week is required of all first year students of this department.*

The Ferry Athletic Field of thirty acres has been set apart and equipped for open-air sports. Room is also provided for tennis courts. Much interest is manifested in foot-ball and base-ball by class and University teams.

The Ann Arbor Golf and Outing Club extends playing rights to a limited number of students. This is a private club, comprising in its membership both citizens and members of the University Faculties.

COURSES OF INSTRUCTION

95. The Courses of Instruction are subject to change from time to time; those proposed for the year 1905-6 and required for graduation, as stated in §§ 130-136, are described below, together with some advanced elective and technical courses, which are designated accordingly. The amount of credit towards graduation assigned to each course is indicated by the expression *one hour, two hours,* etc., an *hour of credit* being given for the satisfactory completion of work equivalent to one exercise a week during one semester. Lectures and recitations are usually one hour in length, but in laboratory work, drawing, and other practical exercises, a longer attendance is required in order to secure an hour of credit. An hour of credit represents ordinarily about three hours of actual work, including preparation.

Courses given in the Department of Literature, Science, and the Arts are (with the exception of the courses in German and in French, for which special permission is required), all open as electives to engineering students who can spare the time and are qualified to pursue them with advantage.

No credit is given for work done outside of the University during the student's connection with the Department of Engineering, unless such work is substantially equivalent to some course offered in the Department and has been done under approved supervision.

Students will be classified and assigned to sections by a Committee of the Faculty. In many subjects the size of the class requires its division into several sections.

A student enrolled in the Department of Literature, Science, and the Arts, and desiring to elect any work in this Department, must obtain written permission from the Dean of the former Department, have it approved by the Dean of the Department of Engineering, and attach the paper to the election slip.

RULES GOVERNING ELECTION OF STUDIES

96. The work of students must be arranged in conformity with the following regulations:

a. Before entering on any study the student must give the instructor satisfactory evidence that he is prepared to pursue it with advantage.

b. No student will be allowed to elect merely a part of a course, without special permission of the Faculty.

c. No credit will be allowed to a student for work in any course, unless the election of the work is formally entered on his classification blank before the work is begun.

d. After the first Saturday of each semester no study can be taken up or dropped without special permission of the Faculty.

e. All requests to the Faculty must be made out on printed forms furnished by the Secretary of the Department.

f. The Faculty requires a student to drop a part of his work at any time, if in its opinion he is undertaking too much; or to take additional work, if it thinks he is not sufficiently employed.

g. The Faculty reserves the right to withdraw the offer of any elective study not chosen by at least six persons.

h. In case of exceptional proficiency, permission to take hours in addition to those named in the published schedule is granted by the Faculty on special request; but in all cases requests for permission to take an additional number of hours must be in the hands of the Secretary (See *e.*) on or before the first *Saturday* of the semester during which the additional work is desired. No permission to take extra hours will be granted to students in their first semester of residence.

i. After matriculation, a student cannot, without special permission of the Faculty, be admitted to examination in any one of the courses given, until he has received in the University the regular instruction in such course.

RULES RELATING TO EXAMINATIONS AND CONDITIONS

97. Examinations for admission are held before the beginning of each semester. (See page 25.)

An applicant who fails in some part of the admission examination may, at the discretion of the Faculty, be admitted conditionally; but any Condition so imposed must be removed at one of the next two regular examinations for admission, and no student who has an Admission Condition outstanding at the beginning of his second year of residence will be allowed to enter his classes until such Condition is removed.

Examinations, usually in writing, are held at the end of each semester (see Schedule page 99), but classes are liable to be examined at any time, without notice, on any portion of their previous work.

To receive credit for a course, duly elected, a student must be reported as *Passed.* If he has the record of *Not Passed,* he cannot receive credit without electing the course anew and pursuing the course again in class. If he has the record of *Conditionally Passed,* he must,

as providec
first two supplementary e
after the second supplem
received credit, then he s be *Not* d
and shall not be entitled to rece credit elect-
ing the course anew.

If he has the record of *Incomplete* or *Absent with Excuse,* he shall present himself for record at the next following supplementary examination. If he does not then present himself, he shall receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge. Any record of *Conditionally Passed* thus reported shall lapse into a *Not Passed* unless the course be satisfactorily passed at the *next* supplementary examination.

Students who are unavoidably absent from an examination should explain their absence as soon as possible, either personally or by letter, to the Associate Dean.

Students who are *Absent without Excuse* from examination will receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge of the course.

Supplementary examinations for those who have been reported *Conditionally Passed, Incomplete,* or *Absent with Excuse,* in regular work will be held three times a year:— viz., on the last Friday and Saturday of the Summer Vacation, on the first Friday and Saturday after the Christmas Vacation, and the first Friday and Saturday after the Spring Recess.

Students who wish to present themselves for examination in any subject must present to the instructor in charge, as early as Wednesday before the examination, a supplementary examination slip obtained from the Secretary.

Students having deficiencies in studies which can be taken during the Summer Session are advised to make up those deficiencies during the Summer Session and thus be enabled to devote their entire attention to the studies elected during the regular session.

The courses announced for the year 1905-6 are as follows:

98. ENGLISH

Mr. Bohn, Mr. Tarbox, and Mr. Breitenbach.

FIRST SEMESTER

[*]1. Paragraphing and Theme Writing. *Four hours.*
2. Technical Journalism. *Two hours.*

SECOND SEMESTER

1. Paragraphing and Theme Writing. *Four hours.*
3. Scientific Literature. Readings, discussions, and essays. Among the authors to be studied are Spencer, Darwin, Huxley, Tyndal, Wallace, Faraday, and Clifford. *Two hours.*

Consultation hours to be arranged with the instructor.

For a description of the courses in English see § 30.

99. GERMAN

Assistant Professor Wait, Mr. Dubee, Mr. Menger.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*

---

[*] All course numbers not followed by *letters in brackets* indicate subjects offered in the Department of Engineering only. The symbol [*a*] following a course number indicates that the course thus designated is also offered in the Department of Literature, Science, and the Arts.

[†] A student admitted on German will take Eight Hours of German and either Eight Hours of French or Eight Hours of Spanish.

A student admitted on French will take Twelve Hours of German and Four Hours of French, or he will take Eight Hours of French and Eight Hours of Spanish.

A student admitted on Latin will take *one* of the three options, viz.,
(a) Sixteen Hours of German.
(b) Sixteen Hours of French.
(c) Eight Hours of French and Eight Hours of Spanish.

4. Reading of German Scientific Literature continued. *Four hours.*
   In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.)
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.)
   An *Elective Course* will not be given unless desired by six or more students qualified to take it.

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*
4. Reading of German Scientific Literature continued. *Four hours.*
   In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.)
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.)
   An *Elective Course* will not be given unless desired by six or more students qualified to take it.

100. FRENCH

Mr. Bird, Mr. Adams, and Mr. Kenyon.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
3. Reading of French Scientific Literature. *Four hours.*
4. Reading of French Scientific Literature continued. *Four hours.*
   In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.)
6. French Conversation. *Three hours.* (Elective.)

7. Commercial and Journalistic French. *Three hours.* (Elective.)
8. A Course in Literary French. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
3. Reading of French Scientific Literature. *Four hours.*
4. Reading of French Scientific Literature continued. *Four hours.*

In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.

5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.)
6. French Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic French. *Three hours.* (Elective.)
8. A Course in Literary French. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

101. **SPANISH**

Mr. Bird, Mr. Adams, and Mr. Kenyon.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
3. Reading, Conversation, and Business Correspondence. *Four hours.*

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
3. Reading, Conversation, and Business Correspondence. *Four hours.*

102. **MATHEMATICS**

Professor Ziwet, Professor Markley, Assistant Professor Glover, Mr. Butts, Mr. Escott, Mr. Marshall, Dr. Running, Dr. Pierce, Dr. Field, Dr. Bradshaw, Dr. Karpinski.

Students of engineering are required to take in order Courses

1, 2, 3, 4, 5, and 6. § 32. Those admitted with a deficiency in plane trigonometry may remove it by completing Course 1*a*, but the credit thus obtained is entered on the admission, not the graduation requirements. § 118.

FIRST SEMESTER

1. [*a*] **Algebra and Analytic Geometry I.** ***Four hours.***
1*a*. [*a*] **Plane Trigonometry.** ***Two hours.***
3. [*a*] **Calculus.** ***Five hours.***
5. [*a*] **Calculus and Mechanics II.** ***Three hours.***
17. [*a*] **Theory of the Potential.** ***Three hours.*** **Professor ZIWET. (Elective.)**
29. [*a*] **Harmonic Analysis I.** ***Two hours.*** **Professor Ziwet. (Elective.)**

SECOND SEMESTER

2. [*a*] **Analytic Geometry II.** ***Four hours.***
2*a*. [*a*] **Spherical Trigonometry.** ***Two hours.*** **(Elective.)**
4. [*a*] **Calculus and Mechanics I.** ***Five hours.***
6. [*a*] **Calculus and Mechanics III.** ***Two hours.***
16. [*a*] **Advanced Mechanics.** ***Three hours.*** **Professor ZIWET. (Elective.)**
30. [*a*] **Harmonic Analysis II.** ***Two hours.*** **Professor ZIWET. (Elective.)**

A section each of Mathematics 1 (Algebra and Analytic Geometry I) and Mathematics 1*a* (Plane Trigonometry) will be arranged in the second semester.

Other and advanced courses are given in the Department of Literature, Science, and the Arts.

103. PHYSICS

Professor CARHART, Professor PATTERSON, Dr. SMITH, Dr. RANDALL, Mr. MOREHOUSE, Mr. HENDERSON.

FIRST SEMESTER

1. [*a*] Mechanics, Sound, and Light. Lectures and recitations. *Five hours.*

For Course 1 a knowledge of plane trigonometry is indispensable.

3*b*. [*a*] Physical Laboratory Work for Beginners. *Two hours.* Fee, $2.

Course 3*b* must be preceded or accompanied by Course 1.

3*c*. [*a*] Laboratory Work in Mechanical and Electrical Measurements. *Three hours.* Fee, $3.

Course 3*c* must be preceded by Course 2. It is designed for students who wish to prepare for the study of dynamo-electric machinery.

5. [*a*] Electrical Measurements. Recitations and laboratory work. *Four hours.* Fee, $3. § 57.
Course 5 must be preceded by Courses 1, 2, 3*b*, and 4 in physics; a knowledge of calculus is required.

7. [*a*] Intermediate Course in Electricity and Magnetism. *Two hours.* (Elective.)
Course 7 must be preceded by Course 2. A knowledge of calculus is required.

8. [*a*] Heat. Laboratory work. *Two hours.* (Elective.)
Course 8 must be preceded by Course 2. Fee, $2.

9. [*a*] Theory of Heat. *Two hours.* (Elective.)

10. [*a*] Mathematical Electricity and Magnetism. *Three hours.* (Elective.)
Course 10 must be preceded by Course 2. A knowledge of calculus is required.

SECOND SEMESTER

2. [*a*] Heat, Electricity, and Magnetism. Lectures and recitations. *Five hours.*
Course 2 must be preceded by Course 1 and by Course 2 in chemistry.

3*b*. [*a*] Physical Laboratory Work for Beginners. *Two hours.* Fee, $2.
Course 3*b* must be preceded or accompanied by Course 1.

3*c*. [*a*] Laboratory Work in Mechanical and Electrical Measurements. *Three hours.* Fee, $3.
Course 3*c* must be preceded by Course 2. It is designed for students who wish to prepare for the study of dynamo-electric machinery.

4. [*a*] Primary and Storage Batteries. Recitations and laboratory work. *Two hours.* Fee, $1. § 56.
Course 1 must be preceded by Courses 1, 2, 3 in physics, and Course 2 in chemistry.

12. [*a*] Electrical Measurements. Continuation of Course 5. Lectures and laboratory work. *Three hours.* Fee, $2.

20. [*a*] Mathematical Electricity and Magnetism. *Two hours.* (Elective.)
Course 20 munst be preceded by Course 10.

16. Theories of Solutions, Electrolytes, and the Voltaic Cell. Lectures and laboratory work. *Three hours.* (Elective.)
Course 16 must be preceded by Course 2 in electrical engineering and by Course 2 in chemistry. It is also desirable for the student to have had laboratory work in chemistry. Fee, $1.

104. CHEMISTRY

Professor Campbell, Professor Johnson, Professor Gomberg, Professor Bigelow, Assistant Professor White, Mr. Higley, Mr. Smeaton, Mr. Willard.

Students admitted with a deficiency in entrance chemistry may remove it by completing Course 1, but the credit thus obtained is entered on the admission, not the graduation requirements. § 118.

Other courses in chemistry are given in the Department of Literature, Science, and the Arts.

FIRST SEMESTER

1. [a] Elementary Inorganic Chemistry. Experimental lectures and recitations. *Two hours.* (For entrance see above.)

2. Principles of Inorganic Chemistry. Lectures and recitations. *Four hours.*

Open to those who have passed the entrance requirements in chemistry.

3. [a] Qualitative Analysis. Recitations and laboratory work. *Seven hours.*

Open to those who have completed Course 2 or an equivalent.

3*a*. Qualitative Analysis. Recitations and laboratory work. *Four hours.*

Open to those who have completed Course 2.

3*b*. Qualitative Analysis. Continuation of Course 3*a*. *Four hours.*

5. [a] Quantitative Analysis. Beginning course. Recitations and laboratory work. *Five hours.*

Open to those who have completed Course 3. It may also be taken at the same time as 3*b*.

7. [a] Organic Chemistry. Lectures and library studies. *Five hours.*

Open to those who have completed Course 3.

28. [a] Advanced Quantitative Analysis. Laboratory work. *Five hours.*

Open to those who have completed Course 5.

29. [a] Iron and Steel Analysis. *Five hours.* Laboratory work, *daily.*

Open to those who have taken Course 28 and who receive special permission.

31. [a] Independent Work in Mineral Analysis. Laboratory work. *Five hours.*

Open to those who have completed Course 28.

32. [a] Technical Examination of Gold and Silver Ores, including the Fire Assay. Laboratory work with lectures and reading. *Two hours.*

Open to those who have completed Course 28. Course 2 in Mineralogy is recommended.

with truncated corners and dimensions of 150 by 90 feet, is well equipped with the various kinds of apparatus usually found in the best modern gymnasiums. A number of smaller rooms are devoted to administration, fencing, boxing, and other special purposes, while the basement is given up to baths and lockers. The main hall is lighted in the daytime by means of a large skylight 60 feet above the floor, and in the evening by electricity. A gallery makes room for an elliptical running-track 375 feet in length.

In the conduct of the gymnasium the aim is not so much the development of a few gymnastic experts as the provision of wholesome physical exercise for the many. The facilities of the building, including physical examinations and instruction, are free to all students, the only charge being a rental of $2 a year for a locker. *Attendance twice a week is required of all first year students of this department.*

The Ferry Athletic Field of thirty acres has been set apart and equipped for open-air sports. Room is also provided for tennis courts. Much interest is manifested in foot-ball and base-ball by class and University teams.

The Ann Arbor Golf and Outing Club extends playing rights to a limited number of students. This is a private club, comprising in its membership both citizens and members of the University Faculties.

COURSES OF INSTRUCTION

95. The Courses of Instruction are subject to change from time to time; those proposed for the year 1905-6 and required for graduation, as stated in §§ 130-136, are described below, together with some advanced elective and technical courses, which are designated accordingly. The amount of credit towards graduation assigned to each course is indicated by the expression *one hour, two hours,* etc., an *hour of credit* being given for the satisfactory completion of work equivalent to one exercise a week during one semester. Lectures and recitations are usually one hour in length, but in laboratory work, drawing, and other practical exercises, a longer attendance is required in order to secure an hour of credit. An hour of credit represents ordinarily about three hours of actual work, including preparation.

Courses given in the Department of Literature, Science, and the Arts are (with the exception of the courses in German and in French, for which special permission is required), all open as electives to engineering students who can spare the time and are qualified to pursue them with advantage.

No credit is given for work done outside of the University during the student's connection with the Department of Engineering, unless such work is substantially equivalent to some course offered in the Department and has been done under approved supervision.

Students will be classified and assigned to sections by a Committee of the Faculty. In many subjects the size of the class requires its division into several sections.

A student enrolled in the Department of Literature, Science, and the Arts, and desiring to elect any work in this Department, must obtain written permission from the Dean of the former Department, have it approved by the Dean of the Department of Engineering, and attach the paper to the election slip.

RULES GOVERNING ELECTION OF STUDIES

96. The work of students must be arranged in conformity with the following regulations:

a. Before entering on any study the student must give the instructor satisfactory evidence that he is prepared to pursue it with advantage.

b. No student will be allowed to elect merely a part of a course, without special permission of the Faculty.

c. No credit will be allowed to a student for work in any course, unless the election of the work is formally entered on his classification blank before the work is begun.

d. After the first Saturday of each semester no study can be taken up or dropped without special permission of the Faculty.

e. All requests to the Faculty must be made out on printed forms furnished by the Secretary of the Department.

f. The Faculty requires a student to drop a part of his work at any time, if in its opinion he is undertaking too much; or to take additional work, if it thinks he is not sufficiently employed.

g. The Faculty reserves the right to withdraw the offer of any elective study not chosen by at least six persons.

h. In case of exceptional proficiency, permission to take hours in addition to those named in the published schedule is granted by the Faculty on special request; but in all cases requests for permission to take an additional number of hours must be in the hands of the Secretary (See *e.*) on or before the first *Saturday* of the semester during which the additional work is desired. No permission to take extra hours will be granted to students in their first semester of residence.

i. After matriculation, a student cannot, without special permission of the Faculty, be admitted to examination in any one of the courses given, until he has received in the University the regular instruction in such course.

RULES RELATING TO EXAMINATIONS AND CONDITIONS

97. Examinations for admission are held before the beginning of each semester. (See page 25.)

An applicant who fails in some part of the admission examination may, at the discretion of the Faculty, be admitted conditionally; but any Condition so imposed must be removed at one of the next two regular examinations for admission, and no student who has an Admission Condition outstanding at the beginning of his second year of residence will be allowed to enter his classes until such Condition is removed.

Examinations, usually in writing, are held at the end of each semester (see Schedule page 99), but classes are liable to be examined at any time, without notice, on any portion of their previous work.

To receive credit for a course, duly elected, a student must be reported as *Passed.* If he has the record of *Not Passed,* he cannot receive credit without electing the course anew and pursuing the course again in class. If he has the record of *Conditionally Passed,* he must, as provided below, complete the course at either of the first two supplementary examinations next following. If, after the second supplementary examination, he has not received credit, then he shall be recorded as *Not Passed* and shall not be entitled to receive credit without electing the course anew.

If he has the record of *Incomplete* or *Absent with Excuse,* he shall present himself for record at the next following supplementary examination. If he does not then present himself, he shall receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge. Any record of *Conditionally Passed* thus reported shall lapse into a *Not Passed* unless the course be satisfactorily passed at the *next* supplementary examination.

Students who are unavoidably absent from an examination should explain their absence as soon as possible, either personally or by letter, to the Associate Dean.

Students who are *Absent without Excuse* from examination will receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge of the course.

Supplementary examinations for those who have been reported *Conditionally Passed, Incomplete,* or *Absent with Excuse,* in regular work will be held three times a year:— viz., on the last Friday and Saturday of the Summer Vacation, on the first Friday and Saturday after the Christmas Vacation, and the first Friday and Saturday after the Spring Recess.

Students who wish to present themselves for examination in any subject must present to the instructor in charge, as early as Wednesday before the examination, a supplementary examination slip obtained from the Secretary.

Students having deficiencies in studies which can be taken during the Summer Session are advised to make up those deficiencies during the Summer Session and thus be enabled to devote their entire attention to the studies elected during the regular session.

The courses announced for the year 1905-6 are as follows:

98. ENGLISH

Mr. BOHN, Mr. TARBOX, and Mr. BREITENBACH.

FIRST SEMESTER

*1. Paragraphing and Theme Writing. *Four hours.*
2. Technical Journalism. *Two hours.*

SECOND SEMESTER

1. Paragraphing and Theme Writing. *Four hours.*
3. Scientific Literature. Readings, discussions, and essays. Among the authors to be studied are Spencer, Darwin, Huxley, Tyndal, Wallace, Faraday, and Clifford. *Two hours.*

Consultation hours to be arranged with the instructor.

For a description of the courses in English see § 30.

99. GERMAN

Assistant Professor WAIT, Mr. DUBEE, Mr. MENGER.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*

---

*All course numbers not followed by *letters in brackets* indicate subjects offered in the Department of Engineering only. The symbol [e] following a course number indicates that the course thus designated is also offered in the Department of Literature, Science, and the Arts.

†A student admitted on German will take Eight Hours of German and either Eight Hours of French or Eight Hours of Spanish.

A student admitted on French will take Twelve Hours of German and Four Hours of French, or he will take Eight Hours of French and Eight Hours of Spanish.

A student admitted on Latin will take *one* of the three options, viz.,
(a) Sixteen Hours of German.
(b) Sixteen Hours of French.
(c) Eight Hours of French and Eight Hours of Spanish.

4. Reading of German Scientific Literature continued. *Four hours.* In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.)
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.) An *Elective Course* will not be given unless desired by six or more students qualified to take it.

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*
4. Reading of German Scientific Literature continued. *Four hours.* In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.)
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.) An *Elective Course* will not be given unless desired by six or more students qualified to take it.

100. FRENCH

Mr. Bird, Mr. Adams, and Mr. Kenyon.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
3. Reading of French Scientific Literature. *Four hours.*
4. Reading of French Scientific Literature continued. *Four hours.* In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.)
6. French Conversation. *Three hours.* (Elective.)

5. [*a*] Electrical Measurements. Recitations and laboratory work. *Four hours.* Fee, $3. § 57.
   Course 5 must be preceded by Courses 1, 2, 3*b*, and 4 in physics; a knowledge of calculus is required.

7. [*a*] Intermediate Course in Electricity and Magnetism. *Two hours.* (Elective.)
   Course 7 must be preceded by Course 2. A knowledge of calculus is required.

8. [*a*] Heat. Laboratory work. *Two hours.* (Elective.)
   Course 8 must be preceded by Course 2. Fee, $2.

9. [*a*] Theory of Heat. *Two hours.* (Elective.)

10. [*a*] Mathematical Electricity and Magnetism. *Three hours.* (Elective.)
    Course 10 must be preceded by Course 2. A knowledge of calculus is required.

SECOND SEMESTER

2. [*a*] Heat, Electricity, and Magnetism. Lectures and recitations. *Five hours.*
   Course 2 must be preceded by Course 1 and by Course 2 in chemistry.

3*b*. [*a*] Physical Laboratory Work for Beginners. *Two hours.* Fee, $2.
   Course 3*b* must be preceded or accompanied by Course 1.

3*c*. [*a*] Laboratory Work in Mechanical and Electrical Measurements. *Three hours.* Fee, $3.
   Course 3*c* must be preceded by Course 2. It is designed for students who wish to prepare for the study of dynamo-electric machinery.

4. [*a*] Primary and Storage Batteries. Recitations and laboratory work. *Two hours.* Fee, $1. § 56.
   Course 1 must be preceded by Courses 1, 2, 3 in physics, and Course 2 in chemistry.

12. [*a*] Electrical Measurements. Continuation of Course 5. Lectures and laboratory work. *Three hours.* Fee, $2.

20. [*a*] Mathematical Electricity and Magnetism. *Two hours.* (Elective.)
    Course 20 munst be preceded by Course 10.

16. Theories of Solutions, Electrolytes, and the Voltaic Cell. Lectures and laboratory work. *Three hours.* (Elective.)
    Course 16 must be preceded by Course 2 in electrical engineering and by Course 2 in chemistry. It is also desirable for the student to have had laboratory work in chemistry. Fee, $1.

104. CHEMISTRY

Professor Campbell, Professor Johnson, Professor Gomberg, Professor Bigelow, Assistant Professor White, Mr. Higley, Mr. Smeaton, Mr. Willard.

Students admitted with a deficiency in entrance chemistry may remove it by completing Course 1, but the credit thus obtained is entered on the admission, not the graduation requirements. § 118.

Other courses in chemistry are given in the Department of Literature, Science, and the Arts.

FIRST SEMESTER

1. [a] Elementary Inorganic Chemistry. Experimental lectures and recitations. *Two hours.* (For entrance see above.)

2. Principles of Inorganic Chemistry. Lectures and recitations. *Four hours.*
Open to those who have passed the entrance requirements in chemistry.

3. [a] Qualitative Analysis. Recitations and laboratory work. *Seven hours.*
Open to those who have completed Course 2 or an equivalent.

3*a*. Qualitative Analysis. Recitations and laboratory work. *Four hours.*
Open to those who have completed Course 2.

3*b*. Qualitative Analysis. Continuation of Course 3*a*. *Four hours.*

5. [a] Quantitative Analysis. Beginning course. Recitations and laboratory work. *Five hours.*
Open to those who have completed Course 3. It may also be taken at the same time as 3*b*.

7. [a] Organic Chemistry. Lectures and library studies. *Five hours.*
Open to those who have completed Course 3.

28. [a] Advanced Quantitative Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 5.

29. [a] Iron and Steel Analysis. *Five hours.* Laboratory work, *daily.*
Open to those who have taken Course 28 and who receive special permission.

31. [a] Independent Work in Mineral Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 28.

32. [a] Technical Examination of Gold and Silver Ores, including the Fire Assay. Laboratory work with lectures and reading. *Two hours.*
Open to those who have completed Course 28. Course 2 in Mineralogy is recommended.

33. [*a*] Chemical Technology. A study of chemical manipulations and reactions on a manufacturing scale. Fuels, water, the acid and alkali industries, clay products, cements, and glass. Lectures, recitations, and assigned reading. *Five hours.*

Open to those who have completed Course 3.

35. [*a*] Technical Gas Analysis, including Calorimetry and Photometry. Laboratory work. *Two hours.*

Open to those who have completed Course 5.

39. [*a*] Chemical Technology. Laboratory work. Courses are regularly offered in:—1. The manufacture of hydraulic cement, with special reference to relation of composition and temperature of burning to physical properties. 2. Coal, gas, and its by-products. 3. Influence of heat and mechanical treatment on constitution of iron and steel. 4. The chemistry of beet sugar, with special reference to its manufacture. Other subjects may be chosen on consultation. *Hours and credit to be arranged with the instructor.*

Course 39 must be preceded by Courses 28 and 33, with Courses 7 and 38 in addition, if the subject chosen is in organic technology.

42. [*a*] Organic Synthesis. Laboratory work. *Three, four, or five hours.*

Course 42 must be preceded by Course 5 and be preceded or accompanied by Course 7.

PRIMARILY FOR GRADUATES

37. [*a*] Original Investigation in Quantitative Analysis. Laboratory work. *Credit arranged with instructor.*

SECOND SEMESTER

2. Principles of Inorganic Chemistry. Lectures and recitations. *Four hours.*

Open to those who have passed the entrance requirements in chemistry.

3. [*a*] Qualitative Analysis. Recitations and laboratory work. *Seven hours.*

Open to those who have completed Course 2 or an equivalent.

3*a*. Qualitative Analysis. Recitations and laboratory work. *Four hours.*

Open to those who have completed Course 2.

3*b*. Qualitative Analysis. Continuation of Course 3*a*. *Four hours.*

5. [*a*] Quantitative Analysis. Beginning course. Recitations and laboratory work. *Five hours.*
Open to those who have completed Course 3. It may also be taken at the same time as 3*b*.

28. [*a*] Advanced Quantitative Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 5.

29. [*a*] Iron and Steel Analysis. *Five hours.* Laboratory work, *daily.*
Open to those who have taken Course 28 and who receive special permission.

31. [*a*] Independent Work in Mineral Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 28.

35. [*a*] Technical Gas Analysis, including Calorimetry and Photometry. Laboratory work. *Two hours.*
Open to those who have completed Course 5.

38. [*a*] Organic Technology. The industrial chemistry of organic compounds. Destructive distillation of coal and wood with recovery of by-products; illuminating gas; starch, glucose and sugar; fermentation and distillation; fats, oils and soaps; bleaching and dyeing; tanning; paper manufacture. Lectures, recitations, and assigned reading. *Five hours.*
Open to those who have completed Courses 7 and 33.

39. [*a*] Chemical Technology. Laboratory work. Courses are regularly offered in:—1. The manufacture of hydraulic cement, with special reference to relation of composition and temperature of burning to physical properties. 2. Coal, gas, and its by-products. 3. Influence of heat and mechanical treatment on constitution of iron and steel. 4. The chemistry of beet sugar, with special reference to its manufacture. Other subjects may be chosen on consultation. *Hours and credit to be arranged with the instructor.*
Course 39 must be preceded by Courses 28 and 33, with Courses 7 and 38 in addition, if the subject chosen is in organic technology.

42. [*a*] Organic Synthesis. Laboratory work. *Three, four, or five hours.*
Course 42 must be preceded by Course 5 and be preceded or accompanied by Course 7.

PRIMARILY FOR GRADUATES

37. [*a*] Original Investigation in Quantitative Analysis. Laboratory work. *Credit arranged with instructor.*

105. METALLURGY

Professor CAMPBELL, Assistant Professor WHITE, Mr. SMEATON.

FIRST SEMESTER

1. [*a*] Fuel and Refractory Material, Iron and Steel. ***Three hours.*** Course 1 must be preceded by Course 2 in chemistry.
2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. ***One hour.*** Open only to those who have taken Course 1.
3. [*a*] Micrometallography. Labortory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. ***One hour.*** Must be preceded or accompanied by Course 2.

SECOND SEMESTER

2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. ***One hour.*** Open only to those who have taken Course 1.
3. [*a*] Micrometallography.. Laboratory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. ***One hour.*** Must be preceded or accompanied by Course 2.

SUMMER SESSION

1. [*a*] Fuel and Refractory Material, Iron and Steel. ***Three hours.*** Course 1 must be preceded by Course 2 in Chemistry.

106. ASTRONOMY

Professor HUSSEY and Mr. ———.

Courses 1 and 2 are mainly descriptive and deal with results; 3 and 4 treat of theory and methods and require night work at the Observatory during a portion of the semester. A knowledge of Integral Calculus is necessary for Course 5, which embraces the theory and practice of orbit determinations.

FIRST SEMESTER

1. [*a*] General Astronomy. The Solar System. ***Two hours.***
3. [*a*] Spherical and Practical Astronomy. Use of Sextant and Transit. ***Two hours.***
4. [*a*] Advanced Practical Course. ***Hours and credit to be arranged.***
5. [*a*] Theoretical Astronomy. ***Four hours.***

SECOND SEMESTER

2. [*a*] General Astronomy. The Stellar System. *Two hours.*
3. [*a*] Spherical and Practical Astronomy. Use of Sextant and Transit. *Two hours.*
4. [*a*] Advanced Practical Course. *Hours and credit to be arranged.*
5. [*a*] **Theoretical Astronomy.** ***Four hours.***
6. [*a*] **Method of Least Squares. Theory of Errors and Adjustment of Observation.** ***Two hours.***

107. MINERALOGY

Assistant Professor Kraus.

FIRST SEMESTER

1. [*a*] **Elements of Mineralogy. Includes the elements of crystallography, physical and chemical properties, occurrence, uses, and determination of the more common minerals. Lectures and laboratory work.** ***Two hours.***

For Course 1 a knowledge of elementary inorganic chemistry is necessary.

3 [*a*] **Crystal Measurements. Measurement, calculation, and projection of crystals. This course is also given in the second semester and may be pursued for either one or two semesters. Lectures and laboratory work.** ***Three hours.***

Course 3 must be preceded by Course 2.

4. [*a*] **Determinative Mineralogy. This course is intended for students who have finished Course 1 and wish to become** more proficient in the determination of minerals. Laboratory work. *Two hours.*

5. [*a*] Blowpipe Methods. The use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals. Lectures and laboratory work. *Two hours.*

Course 5 musst be preceded by Course 2, or Courses 1 and 4.

6 [*a*] Research Work. For students, who are properly qualified, opportunity is given for original research along the lines of crystal measurements, chemical crystallography, or the formation and origin of minerals. Laboratory work. *Credit to be arranged.*

SECOND SEMESTER

1 [*a*] Elements of Mineralogy. Includes the elements of crystallography, physical and chemical properties, occurrence, uses, and determination of the more common minerals. Lectures and laboratory work. *Two hours.*

For Course 1 a knewledge of elementary inorganic chemistry is necessary.

2. [*a*] General Mineralogy. Principles of crystallography, physical and chemical properties, origin, formation, decomposition, distribution, uses and determination of the more important minerals. Lectures and laboratory work. *Five hours.*

Course 2 must be preceded by Courses 2 and 3 in chemistry.

3. [*a*] Crystal Measurements. Measurement, calculation, and projection of crystals. This course is also given in the first semester and may be pursued for either one or two semesters. Lectures and laboratory work. *Three hours.*

Course 3 must be preceded by Course 2.

4. [*a*] Determinative Mineralogy. This course is intended for students who have finished Course 1 and wish to become more proficient in the determination of minerals. Laboratory work. *Two hours.*

5. [*a*] Blowpipe Methods. The use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals. Lectures and laboratory work. *Two hours.*

Course 5 must be preceded by Course 2, or Courses 1 and 4.

6. [*a*] Research Work. For students, who are properly qualified, opportunity is given for original research along the lines of crystal measurements, chemical crystallography, or the formation and origin of minerals. Laboratory work. *Credit to be arranged.*

108. GEOLOGY

Professor Russell and Dr. Lane.

FIRST SEMESTER

3. [*a*] Advanced Geology. Reading and conferences, with laboratory and field work. *Two hours.* Professor Russell.

Course 3 must be preceded by Courses 1 or 6, and 8.

SECOND SEMESTER

6. [*a*] Elements of Geology. Dynamic and Structural Geology. Lectures, recitations, reading, and short theses. *Three hours.* Professor Russell.

8. [*a*] Elements of Geology. Historical Geology, dealing principally with the geological history of the United States. Text-book, illustrated lectures, recitations, and a short thesis. *Three hours.* Professor Russell.

Course 8 is a continuation of Course 1.

10. [*a*] Economic Geology. Lectures on the mode of occurrence, theories of deposition, concentration, etc., of metallic and non-metallic minerals, building stones, etc., of commercial value. Special attention is given to the mineral wealth of Michigan. *Two hours.* Dr. Lane.

Course 10 must be preceded by Course 1 or 6.

109. DRAWING

Professor Denison, Assistant Professor Goulding, Miss Hunt, Mr. Wilson, Mr. Bartlett, Mr. Murphey, Mr. ———.

FIRST SEMESTER

1. [*a*] Geometrical Drawing. *Four hours.* § 35. (Elective.)
2. [*a*] Free-Hand Drawing. Pencil, Pen and Ink. Sketching. *Three hours.* (Elective.)
4. [*a*] Descriptive Geometry. Recitations and Drawing. *Four hours.*
5. [*a*] Advanced Projections and Stereotomy. *Four hours.*
Course 5 must be preceded by Course 4.
6. [*a*] Advanced Projections. *Two hours.*
Course 6 must be preceded by Course 4.
8. [*a*] Continuation of Course 7. *Two hours.* (Elective.)
Course 8 must be preceded by Courses 2, 3, and 7.
9. [*a*] Water-Color Drawing. Historic Ornament and Design. *Three hours.* (Elective.)
10. [*a*] Free-Hand Lettering. *Two hours.* (Elective.)

SECOND SEMESTER

1. [*a*] Geometrical Drawing. *Four hours.* § 35. (Elective.)
2. [*a*] Free-Hand Drawing. Pencil, Pen and Ink. Sketching. *Three hours.* (Elective.)
3. [*a*] Free-Hand Drawing (advanced). *Three hours.* (Elective.)
4. [*a*] Descriptive Geometry. Recitations and Drawing. *Four hours.*
5. [*a*] Advanced Projections and Stereotomy. *Four hours.*
Course 5 must be preceded by Course 4.
6. [*a*] Advanced Projections. *Two hours.*
Course 6 must be preceded by Course 4.
7. [*a*] Water-Color Drawing. *Two hours.* (Elective.)
9*a*. [*a*] Water-Color Drawing. Historic Ornament and Design (continued). *Three hours.* (Elective.)
10. [*a*] Free-Hand Lettering. *Two hours.* (Elective.)
11. [*a*] Spherical Projections. *One hour.* (Elective).
Course 11 must be preceded by Course 4.

110. SHOP PRACTICE

Superintendent MIGGETT; Shop-Instructors, PURFIELD, WINSLOW, COBB, McDONALD, WILLARD.

The shop courses consist of actual practice in the shops, together with class-room recitations for which outside preparation is made from text-books and oral instruction.

Courses 1 to 4 may be continued by advanced students as Courses 1*a* to 4*a*.

Special arrangements are made for students who desire to take more advanced shop courses with a view to preparing themselves for teaching these subjects. § 36.

FIRST SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.

SECOND SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.
5. Instrument Making. *Two hours.* Fee, $5.00.

SUMMER SESSION

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.co.
3. Machine Shop. *Four hours.* Fee, $10.00.
5. Instrument Making. *Two hours.* Fee, $5.00.

111. SURVEYING

Professor J. B. DAVIS, Mr. MERRICK, Mr. ————.

FIRST SEMESTER

1. Surveying. Lectures, Text-book, and Field Practice. *Five hours.* § 38.

   The field practice in Course 1 continues during favorable weather until Christmas.

2. **Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing.** ***Five hours.***
4. **Use of Instruments.** ***One hour.*** **§ 38 (*b*).**

SECOND SEMESTER

1. **Surveying. Lectures, Text-book, and Field Practice.** ***Five hours.*** **§ 38.**
2. **Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing.** ***Five hours.***
7. **Geodesy. Geodetic Methods. Lectures and texts.** ***Three hours.*** **(Elective.) § 39.**

Course 7 must be preceded by Courses 1 and 2.

SUMMER SESSION

3. **Field Work in Camp.** ***Six weeks.*** **§ 38.**

Open only to students in civil engineering except by special permission of the Faculty.

112. CIVIL ENGINEERING

Professor Williams, Professor J. B. Davis, Assistant Professor Wrentmore, Assistant Professor Greene, Mr. Tilden, Mr. ———.

FIRST SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*

Course 1 must be preceded or accompanied by Course 5 in mathematics.

2. Theory and Analysis of Structures. Lectures and text. Four times a week. *Four hours.*

Course 2 must be preceded by Course 1.

3. Structural Design. Computations and Draughting. Five afternoons a week. *Four hours.*

Course 3 must be preceded or accompanied by Course 2.

5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*

Course 5 must be preceded or accompanied by Course 6 in mathematics.

6. Municipal Engineering. Lectures and text. Three times a week. *Two hours.*

Course 6 must be preceded by Course 1 and preceded or accompanied by Course 5.

8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*

Course 8 must be preceded by Course 5.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SECOND SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*
   Course 1 must be preceded or accompanied by Course 5 in mathematics.
4. Engineering Constructions. Lectures and text. Three times a week. *Two hours.*
   Course 4 must be preceded by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*
   Course 5 must be preceded or accompanied by Course 6 in mathematics.
7. Water Supply Engineering. Lectures and text. Four times a week. . *Two hours.*
   Course 7 must be preceded by Courses 1, 5, and 6.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*
   Course 8 must be preceded by Course 5.
9. Advanced Structural Design. Lectures, computations and drawing. Three times a week. *Three hours.*
   Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.
10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SUMMER SESSION

11. Elements of Strength and Resistance. Text. For chemical engineers. *Two hours.*
    Course 11 must be preceded by Course 4 in mathematics and Course 2 in physics.

113. MECHANICAL ENGINEERING

Professor Cooley, Professor Denison, Professor Allen, Superintendent Migget, Assistant Professor Anderson, Assistant Professor Goulding, Assistant Professor Hazelton, Mr. Bragg, Mr. Bursley, Mr. Loomis, Mr. Higbie.

FIRST SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.

3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
   Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
   Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
    Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
11. Gas Engines. *Two hours.*
    Course 11 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 55.
    Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
    Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
    Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.

33. [*a*] Chemical Technology. A study of chemical manipulations and reactions on a manufacturing scale. Fuels, water, the acid and alkali industries, clay products, cements, and glass. Lectures, recitations, and assigned reading. *Five hours.*

Open to those who have completed Course 3.

35. [*a*] Technical Gas Analysis, including Calorimetry and Photometry. Laboratory work. *Two hours.*

Open to those who have completed Course 5.

39. [*a*] Chemical Technology. Laboratory work. Courses are regularly offered in:—1. The manufacture of hydraulic cement, with special reference to relation of composition and temperature of burning to physical properties. 2. Coal, gas, and its by-products. 3. Influence of heat and mechanical treatment on constitution of iron and steel. 4. The chemistry of beet sugar, with special reference to its manufacture. Other subjects may be chosen on consultation. *Hours and credit to be arranged with the instructor.*

Course 39 must be preceded by Courses 28 and 33, with Courses 7 and 38 in addition, if the subject chosen is in organic technology.

42. [*a*] Organic Synthesis. Laboratory work. *Three, four, or five hours.*

Course 42 must be preceded by Course 5 and be preceded or accompanied by Course 7.

PRIMARILY FOR GRADUATES

37. [*a*] Original Investigation in Quantitative Analysis. Laboratory work. *Credit arranged with instructor.*

SECOND SEMESTER

2. Principles of Inorganic Chemistry. Lectures and recitations. *Four hours.*

Open to those who have passed the entrance requirements in chemistry.

3. [*a*] Qualitative Analysis. Recitations and laboratory work. *Seven hours.*

Open to those who have completed Course 2 or an equivalent.

3*a*. Qualitative Analysis. Recitations and laboratory work. *Four hours.*

Open to those who have completed Course 2.

3*b*. Qualitative Analysis. Continuation of Course 3*a*. *Four hours.*

5. [*a*] Quantitative Analysis. Beginning course. Recitations and laboratory work. *Five hours.*
Open to those who have completed Course 3. It may also be taken at the same time as 3*b*.

28. [*a*] Advanced Quantitative Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 5.

29. [*a*] Iron and Steel Analysis. *Five hours.* Laboratory work, *daily.*
Open to those who have taken Course 28 and who receive special permission.

31. [*a*] Independent Work in Mineral Analysis. Laboratory work. *Five hours.*
Open to those who have completed Course 28.

35. [*a*] Technical Gas Analysis, including Calorimetry and Photometry. Laboratory work. *Two hours.*
Open to those who have completed Course 5.

38. [*a*] Organic Technology. The industrial chemistry of organic compounds. Destructive distillation of coal and wood with recovery of by-products; illuminating gas; starch, glucose and sugar; fermentation and distillation; fats, oils and soaps; bleaching and dyeing; tanning; paper manufacture. Lectures, recitations, and assigned reading. *Five hours.*
Open to those who have completed Courses 7 and 33.

39. [*a*] Chemical Technology. Laboratory work. Courses are regularly offered in:—1. The manufacture of hydraulic cement, with special reference to relation of composition and temperature of burning to physical properties. 2. Coal, gas, and its by-products. 3. Influence of heat and mechanical treatment on constitution of iron and steel. 4. The chemistry of beet sugar, with special reference to its manufacture. Other subjects may be chosen on consultation. *Hours and credit to be arranged with the instructor.*
Course 39 must be preceded by Courses 28 and 33, with Courses 7 and 38 in addition, if the subject chosen is in organic technology.

42. [*a*] Organic Synthesis. Laboratory work. *Three, four, or five hours.*
Course 42 must be preceded by Course 5 and be preceded or accompanied by Course 7.

PRIMARILY FOR GRADUATES

37. [*a*] Original Investigation in Quantitative Analysis. Laboratory work. *Credit arranged with instructor.*

105. METALLURGY

Professor CAMPBELL, Assistant Professor WHITE, Mr. SMEATON.

FIRST SEMESTER

1. [*a*] Fuel and Refractory Material, Iron and Steel. *Three hours.* Course 1 must be preceded by Course 2 in chemistry.
2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. *One hour.* Open only to those who have taken Course 1.
3. [*a*] Micrometallography. Labortory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. *One hour.* Must be preceded or accompanied by Course 2.

SECOND SEMESTER

2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. *One hour.* Open only to those who have taken Course 1.
3. [*a*] Micrometallography.. Laboratory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. *One hour.* Must be preceded or accompanied by Course 2.

SUMMER SESSION

1. [*a*] Fuel and Refractory Material, Iron and Steel. *Three hours.* Course 1 must be preceded by Course 2 in Chemistry.

106. ASTRONOMY

Professor HUSSEY and Mr. ————.

Courses 1 and 2 are mainly descriptive and deal with results; 3 and 4 treat of theory and methods and require night work at the Observatory during a portion of the semester. A knowledge of Integral Calculus is necessary for Course 5, which embraces the theory and practice of orbit determinations.

FIRST SEMESTER

1. [*a*] General Astronomy. The Solar System. *Two hours.*
3. [*a*] Spherical and Practical Astronomy. Use of Sextant and Transit. *Two hours.*
4. [*a*] Advanced Practical Course. *Hours and credit to be arranged.*
5. [*a*] Theoretical Astronomy. *Four hours.*

SECOND SEMESTER

2. [*a*] General Astronomy. The Stellar System. *Two hours.*

3. [*a*] Spherical and Practical Astronomy. Use of Sextant and Transit. *Two hours.*

4. [*a*] Advanced Practical Course. *Hours and credit to be arranged.*

5. [*a*] Theoretical Astronomy. *Four hours.*

6. [*a*] Method of Least Squares. Theory of Errors and Adjustment of Observation. *Two hours.*

107. MINERALOGY

Assistant Professor KRAUS.

FIRST SEMESTER

1. [*a*] Elements of Mineralogy. Includes the elements of crystallography, physical and chemical properties, occurrence, uses, and determination of the more common minerals. Lectures and laboratory work. *Two hours.*

For Course 1 a knowledge of elementary inorganic chemistry is necessary.

3 [*a*] Crystal Measurements. Measurement, calculation, and projection of crystals. This course is also given in the second semester and may be pursued for either one or two semesters. Lectures and laboratory work. *Three hours.*

Course 3 must be preceded by Course 2.

4. [*a*] Determinative Mineralogy. This course is intended for students who have finished Course 1 and wish to become more proficient in the determination of minerals. Laboratory work. *Two hours.*

5. [*a*] Blowpipe Methods. The use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals. Lectures and laboratory work. *Two hours.*

Course 5 musst be preceded by Course 2, or Courses 1 and 4.

6 [*a*] Research Work. For students, who are properly qualified, opportunity is given for original research along the lines of crystal measurements, chemical crystallography, or the formation and origin of minerals. Laboratory work. *Credit to be arranged.*

SECOND SEMESTER

1 [*a*] Elements of Mineralogy. Includes the elements of crystallography, physical and chemical properties, occurrence, uses, and determination of the more common minerals. Lectures and laboratory work. *Two hours.*

For Course 1 a knewledge of elementary inorganic chemistry is necessary.

2. [*a*] General Mineralogy. Principles of crystallography, physical and chemical properties, origin, formation, decomposition, distribution, uses and determination of the more important minerals. Lectures and laboratory work. *Five hours.*

Course 2 must be preceded by Courses 2 and 3 in chemistry.

3. [*a*] Crystal Measurements. Measurement, calculation, and projection of crystals. This course is also given in the first semester and may be pursued for either one or two semesters. Lectures and laboratory work. *Three hours.*

Course 3 must be preceded by Course 2.

4. [*a*] Determinative Mineralogy. This course is intended for students who have finished Course 1 and wish to become more proficient in the determination of minerals. Laboratory work. *Two hours.*

5. [*a*] Blowpipe Methods. The use of blowpipe reactions upon charcoal and plaster tablets, as well as other chemical methods useful in the determination of minerals. Lectures and laboratory work. *Two hours.*

Course 5 must be preceded by Course 2, or Courses 1 and 4.

6. [*a*] Research Work. For students, who are properly qualified, opportunity is given for original research along the lines of crystal measurements, chemical crystallography, or the formation and origin of minerals. Laboratory work. *Credit to be arranged.*

108. GEOLOGY

Professor RUSSELL and Dr. LANE.

FIRST SEMESTER

3. [*a*] Advanced Geology. Reading and conferences, with laboratory and field work. *Two hours.* Professor RUSSELL.

Course 3 must be preceded by Courses 1 or 6, and 8.

SECOND SEMESTER

6. [*a*] Elements of Geology. Dynamic and Structural Geology. Lectures, recitations, reading, and short theses. *Three hours.* Professor RUSSELL.

8. [*a*] Elements of Geology. Historical Geology, dealing principally with the geological history of the United States. Text-book, illustrated lectures, recitations, and a short thesis. *Three hours.* Professor RUSSELL.

Course 8 is a continuation of Course 1.

10. [a] Economic Geology. Lectures on the mode of occurrence, theories of deposition, concentration, etc., of metallic and non-metallic minerals, building stones, etc., of commercial value. Special attention is given to the mineral wealth of Michigan. *Two hours.* Dr. LANE.
Course 10 must be preceded by Course 1 or 6.

109. DRAWING

Professor DENISON, Assistant Professor GOULDING, Miss HUNT, Mr. WILSON, Mr. BARTLETT, Mr. MURPHEY, Mr. ———.

FIRST SEMESTER

1. [a] Geometrical Drawing. *Four hours.* § 35. (Elective.)
2. [a] Free-Hand Drawing. Pencil, Pen and Ink. Sketching. *Three hours.* (Elective.)
4. [a] Descriptive Geometry. Recitations and Drawing. *Four hours.*
5. [a] Advanced Projections and Stereotomy. *Four hours.*
Course 5 must be preceded by Course 4.
6. [a] Advanced Projections. *Two hours.*
Course 6 must be preceded by Course 4.
8. [a] Continuation of Course 7. *Two hours.* (Elective.)
Course 8 must be preceded by Courses 2, 3, and 7.
9. [a] Water-Color Drawing. Historic Ornament and Design. *Three hours.* (Elective.)
10. [a] Free-Hand Lettering. *Two hours.* (Elective.)

SECOND SEMESTER

1. [a] Geometrical Drawing. *Four hours.* § 35. (Elective.)
2. [a] Free-Hand Drawing. Pencil, Pen and Ink. Sketching. *Three hours.* (Elective.)
3. [a] Free-Hand Drawing (advanced). *Three hours.* (Elective.)
4. [a] Descriptive Geometry. Recitations and Drawing. *Four hours.*
5. [a] Advanced Projections and Stereotomy. *Four hours.*
Course 5 must be preceded by Course 4.
6. [a] Advanced Projections. *Two hours.*
Course 6 must be preceded by Course 4.
7. [a] Water-Color Drawing. *Two hours.* (Elective.)
9a. [a] Water-Color Drawing. Historic Ornament and Design (continued). *Three hours.* (Elective.)
10. [a] Free-Hand Lettering. *Two hours.* (Elective.)
11. [a] Spherical Projections. *One hour.* (Elective).
Course 11 must be preceded by Course 4.

110. SHOP PRACTICE

Superintendent MIGGETT; Shop-Instructors, PURFIELD, WINSLOW, COBB, McDONALD, WILLARD.

The shop courses consist of actual practice in the shops, together with class-room recitations for which outside preparation is made from text-books and oral instruction.

Courses 1 to 4 may be continued by advanced students as Courses 1*a* to 4*a*.

Special arrangements are made for students who desire to take more advanced shop courses with a view to preparing themselves for teaching these subjects. § 36.

FIRST SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.

SECOND SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.
5. Instrument Making. *Two hours.* Fee, $5.00.

SUMMER SESSION

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.

5. Instrument Making. *Two hours.* Fee, $5.00.

111. SURVEYING

Professor J. B. DAVIS, Mr. MERRICK, Mr. ——————.

FIRST SEMESTER

1. Surveying. Lectures, Text-book, and Field Practice. *Five hours.* § 38.

   The field practice in Course 1 continues during favorable weather until Christmas.

2. Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing. *Five hours.*
4. Use of Instruments. *One hour.* § 38 (*b*).

SECOND SEMESTER

1. Surveying. Lectures, Text-book, and Field Practice. *Five hours.* § 38.
2. Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing. *Five hours.*
7. Geodesy. Geodetic Methods. Lectures and texts. *Three hours.* (Elective.) § 39.

   Course 7 must be preceded by Courses 1 and 2.

SUMMER SESSION

3. Field Work in Camp. *Six weeks.* § 38.

   Open only to students in civil engineering except by special permission of the Faculty.

112. CIVIL ENGINEERING

Professor WILLIAMS, Professor J. B. DAVIS, Assistant Professor WRENTMORE, Assistant Professor. GREENE, Mr. TIEDEN, Mr. ————.

FIRST SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*

   Course 1 must be preceded or accompanied by Course 5 in mathematics.
2. Theory and Analysis of Structures. Lectures and text. Four times a week. *Four hours.*

   Course 2 must be preceded by Course 1.
3. Structural Design. Computations and Draughting. Five afternoons a week. *Four hours.*

   Course 3 must be preceded or accompanied by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*

   Course 5 must be preceded or accompanied by Course 6 in mathematics.
6. Municipal Engineering. Lectures and text. Three times a week. *Two hours.*

   Course 6 must be preceded by Course 1 and preceded or accompanied by Course 5.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*

   Course 8 must be preceded by Course 5.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SECOND SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*
   Course 1 must be preceded or accompanied by Course 5 in mathematics.
4. Engineering Constructions. Lectures and text. Three times a week. *Two hours.*
   Course 4 must be preceded by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*
   Course 5 must be preceded or accompanied by Course 6 in mathematics.
7. Water Supply Engineering. Lectures and text. Four times a week. . *Two hours.*
   Course 7 must be preceded by Courses 1, 5, and 6.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*
   Course 8 must be preceded by Course 5.
9. Advanced Structural Design. Lectures, computations and drawing. Three times a week. *Three hours.*
   Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.
10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SUMMER SESSION

11. Elements of Strength and Resistance. Text. For chemical engineers. *Two hours.*
    Course 11 must be preceded by Course 4 in mathematics and Course 2 in physics.

113. MECHANICAL ENGINEERING

Professor Cooley, Professor Denison, Professor Allen, Superintendent Migget, Assistant Professor Anderson, Assistant Professor Goulding, Assistant Professor Hazelton,
Mr. Bragg, Mr. Bursley, Mr. Loomis,
Mr. Higbie.

FIRST SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.

3. Steam Engines and other Heat Engines. *Four hours.*
Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
11. Gas Engines. *Two hours.*
Course 11 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 55.
Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
Course 7 must be preceded by Course 3.

105. METALLURGY

Professor CAMPBELL, Assistant Professor WHITE, Mr. SMEATON.

FIRST SEMESTER

1. [*a*] Fuel and Refractory Material, Iron and Steel. *Three hours.* Course 1 must be preceded by Course 2 in chemistry.
2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. *One hour.* Open only to those who have taken Course 1.
3. [*a*] Micrometallography. Labortory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. *One hour.* Must be preceded or accompanied by Course 2.

SECOND SEMESTER

2. [*a*] Descriptive study of the influence of mechanical and heat treatment upon the microstructure and properties of metals and alloys. Lectures and reading. *One hour.* Open only to those who have taken Course 1.
3. [*a*] Micrometallography.. Laboratory course on the microscopic structure of metals and alloys as related to their physical and chemical properties. *One hour.* Must be preceded or accompanied by Course 2.

SUMMER SESSION

1. [*a*] Fuel and Refractory Material, Iron and Steel. *Three hours.* Course 1 must be preceded by Course 2 in Chemistry.

106. ASTRONOMY

Professor HUSSEY and Mr. ———.

Courses 1 and 2 are mainly descriptive and deal with results; 3 and 4 treat of theory and methods and require night work at the Observatory during a portion of the semester. A knowledge of Integral Calculus is necessary for Course 5, which embraces the theory and practice of orbit determinations.

FIRST SEMESTER

1. [*a*] General Astronomy. The Solar System. *Two hours.*
3. [*a*] Spherical and Practical Astronomy. Use of Sextant and Transit. *Two hours.*
4. [*a*] Advanced Practical Course. *Hours and credit to be arranged.*
5. [*a*] Theoretical Astronomy. *Four hours.*

Course 11 must be preceded by Course 1 or Course 2.
Course 11, omitted in 1904-1905, will be given in 1905-1906.

13. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Lectures and recitations. *Two hours.*
Course 13 must be preceded or accompanied by Course 1 or 2.

15. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 15 must be preceded or accompanied by Course 13.
Course 15, omitted in 1904-1905, will be given in 1905-1906.

SECOND SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Three hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 2 must be preceded by Courses 1, 2, 3, 4, and 5 in physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. Lectures, recitations and laboratory work. *Two hours.*
Course 4 must be preceded by Course 1 or 4.

6. Design of Electrical Machinery and Appliances. Drawing. *Two hours.*
Course 6 must be preceded by Course 5, of which Course 6 is the continuation.

8. Electric Railways. Lectures and recitations. *Two hours.*
Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. Lectures and reading. *Two hours.*

12. Distribution of Electricity. Lectures. *Two hours.*
Course 12 must be preceded by Course 1 or 2.

14. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 14 must be preceded by Course 13.

SUMMER SESSION

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Three hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. Course 1 is intended for students not candidates in electrical engineering.

115. **CHEMICAL ENGINEERING** (See *Chemistry*, § 104.)

116. NAVAL ARCHITECTURE AND MARINE ENGINEERING

Professor Cooley, Professor Sadler, Mr. Bragg.

FIRST SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
3. Naval Architecture. Strength of ships and preliminary design. *Two hours.*

Course 3 must be preceded or accompanied by Course 2.

5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
6. Naval Architecture. Ship drawing and design. *Three hours.*
8. Marine Boilers. Lectures and recitations. *Two hours.*
10. Marine Engine and Boiler Drawing and Design. *One hour.*

SECOND SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
4. Naval Architecture. Stability, resistance and propulsion of ships. *Four hours.*
5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
7. Naval Architecture. Ship drawing and design. *Three hours.*
9. Marine Engines. Lectures and recitations. *Two hours.*
11. Marine Engine and Boiler Drawing and Design. *Two hours.*

PRIMARILY FOR GRADUATES

12. Experimental Tank Work. *Two hours.*
13. Ship and Engine Specifications. *Two hours.*
14. Pumping and Ventilation. *One hour.*
15. Advanced Reading. *Three hours.*
16. Advanced Drawing. *Five hours.*

Students wishing to specialize in Marine Engine and Boiler Design will elect Courses 6 and 7 as *three hours* each, and Courses 10 and 11 as *one hour* each.

SEQUENCE OF STUDIES

117. The work of the first year is the same for all regular students. At the end of the first year, the student makes his choice to continue in the civil engineering, the

mechanical engineering, the electrical engineering, the chemical engineering, or the marine engineering course. The student, in any course but chemical engineering, who desires to graduate in marine engineering, will elect the work in naval architecture and marine engineering in his *fourth* year, as specified in § 124.

There is a limited opportunity for electives in some semesters, and credits obtained in advance at entrance may leave a place for substitutions. After the first year the student may take work to the amount of ***eighteen hours*** per week, as arranged by the classification committee; but ***he may wisely, in some cases, take a smaller number of hours,*** if he can in that way do more thorough work. See "Rules Governing Election of Studies," § 96.

118. NEW ORDER OF STUDIES

The order of studies for students entering *after* commencement, 1905, and thereafter, is as follows. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond with this order.

One hundred and forty hours will hereafter be required for graduation, the thesis being omitted.

The order of studies for the first year is the same for all students.

First Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 1,	4 hours	Mathematics 2,	4 hours
*Language,	4 hours	*Language,	4 hours
†Chemistry 2,	4 hours	†Drawing 4,	4 hours
or		or	
Drawing 4,	4 hours	*Chemistry* 2,	4 hours
†English 1,	4 hours	†Shop Work 1,	4 hours
or		or	
Shop Work 1,	4 hours	*English* 1,	4 hours
‡Gymnasium Work,		‡Gymnasium Work,	
	16 hours		16 hours

---

*See note, page 60.

†The student taking Chemistry 2 the first semester will take Drawing 4 the second semester; likewise, the student taking English 1 the first semester will take Shop Work 1 the second semester; and *vice versa.*

‡See italics, § 94.

110. SHOP PRACTICE

Superintendent MIGGETT; Shop-Instructors, PURFIELD, WINSLOW, COBB, MCDONALD, WILLARD.

The shop courses consist of actual practice in the shops, together with class-room recitations for which outside preparation is made from text-books and oral instruction.

Courses 1 to 4 may be continued by advanced students as Courses 1*a* to 4*a*.

Special arrangements are made for students who desire to take more advanced shop courses with a view to preparing themselves for teaching these subjects. § 36.

FIRST SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.

SECOND SEMESTER

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.00.
5. Instrument Making. *Two hours.* Fee, $5.00.

SUMMER SESSION

1. Woodwork, Pattern-making, Foundry, Forging and metal forming and cutting operations. *Four hours.* Fee, $10.00.
2. Pattern-making and Foundry. (Advanced.) *Four hours.* Fee, $10.00.
3. Machine Shop. *Four hours.* Fee, $10.00.
5. Instrument Making. *Two hours.* Fee, $5.00.

111. SURVEYING

Professor J. B. DAVIS, Mr. MERRICK, Mr. ——————.

FIRST SEMESTER

1. Surveying. Lectures, Text-book, and Field Practice. *Five hours.* § 38.

   The field practice in Course 1 continues during favorable weather until Christmas.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	16 hours		**13 hours**

120. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	**5 hours**	**Mathematics 4,**	**5 hours**
***Language,**	**4 hours**	***Language,**	**4 hours**
Physics 1,	**5 hours**	**Physics 2,**	**5 hours**
Shop Work 2,	**4 hours**	**Shop Work 3,**	**4 hours**
or		**or**	
Shop Work 3,	**4 hours**	**Shop Work 2,**	**4 hours**
	18 hours		**18 hours**

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 3,	4 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 4,	3 hours	or	
		Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			17 or 16 hours

---

*See note, page 60.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SECOND SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*
   Course 1 must be preceded or accompanied by Course 5 in mathematics.
4. Engineering Constructions. Lectures and text. Three times a week. *Two hours.*
   Course 4 must be preceded by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*
   Course 5 must be preceded or accompanied by Course 6 in mathematics.
7. Water Supply Engineering. Lectures and text. Four times a week. *Two hours.*
   Course 7 must be preceded by Courses 1, 5, and 6.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*
   Course 8 must be preceded by Course 5.
9. Advanced Structural Design. Lectures, computations and drawing. Three times a week. *Three hours.*
   Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.
10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SUMMER SESSION

11. Elements of Strength and Resistance. Text. For chemical engineers. *Two hours.*
    Course 11 must be preceded by Course 4 in mathematics and Course 2 in physics.

113. **MECHANICAL ENGINEERING**

Professor Cooley, Professor Denison, Professor Allen, Superintendent Migget, Assistant Professor Anderson, Assistant Professor Goulding, Assistant Professor Hazelton, Mr. Bragg, Mr. Bursley, Mr. Loomis, Mr. Higbie.

FIRST SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.

2. Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing. *Five hours.*
4. Use of Instruments. *One hour.* § 38 (*b*).

SECOND SEMESTER

1. Surveying. Lectures, Text-book, and Field Practice. *Five hours.* § 38.
2. Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing. *Five hours.*
7. Geodesy. Geodetic Methods. Lectures and texts. *Three hours.* (Elective.) § 39.
   Course 7 must be preceded by Courses 1 and 2.

SUMMER SESSION

3. Field Work in Camp. *Six weeks.* § 38.
   Open only to students in civil engineering except by special permission of the Faculty.

112. CIVIL ENGINEERING

Professor Williams, Professor J. B. Davis, Assistant Professor Wrentmore, Assistant Professor Greene, Mr. Tilden, Mr. ————.

FIRST SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*
   Course 1 must be preceded or accompanied by Course 5 in mathematics.
2. Theory and Analysis of Structures. Lectures and text. Four times a week. *Four hours.*
   Course 2 must be preceded by Course 1.
3. Structural Design. Computations and Draughting. Five afternoons a week. *Four hours.*
   Course 3 must be preceded or accompanied by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*
   Course 5 must be preceded or accompanied by Course 6 in mathematics.
6. Municipal Engineering. Lectures and text. Three times a week. *Two hours.*
   Course 6 must be preceded by Course 1 and preceded or accompanied by Course 5.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*
   Course 8 must be preceded by Course 5.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SECOND SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*
   Course 1 must be preceded or accompanied by Course 5 in mathematics.
4. Engineering Constructions. Lectures and text. Three times a week. *Two hours.*
   Course 4 must be preceded by Course 2.
5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*
   Course 5 must be preceded or accompanied by Course 6 in mathematics.
7. Water Supply Engineering. Lectures and text. Four times a week. . *Two hours.*
   Course 7 must be preceded by Courses 1, 5, and 6.
8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*
   Course 8 must be preceded by Course 5.
9. Advanced Structural Design. Lectures, computations and drawing. Three times a week. *Three hours.*
   Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.
10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*
    Course 10 must be preceded by Course 1.

SUMMER SESSION

11. Elements of Strength and Resistance. Text. For chemical engineers. *Two hours.*
    Course 11 must be preceded by Course 4 in mathematics and Course 2 in physics.

113. MECHANICAL ENGINEERING

Professor Cooley, Professor Denison, Professor Allen, Superintendent Migget, Assistant Professor Anderson, Assistant Professor Goulding, Assistant Professor Hazelton, Mr. Bragg, Mr. Bursley, Mr. Loomis, Mr. Higbie.

FIRST SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.

3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
   Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
   Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
    Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
11. Gas Engines. *Two hours.*
    Course 11 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 55.
    Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
    Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
    Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.

8. Machine Design. Hoisting Machinery. *Three hours.*
Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
12. Power Plants. Power Transmission. *Two hours.*
Course 12 must be preceded by Course 3 and Course 5 in civil engineering.
14. Compressed Air and Refrigeration. *Two hours.*
Course 14 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

18. Thermodynamics (advanced). Steam Turbines. *Two hours.*
Course 18 must be preceded by Course 5.
19. Machine Design (advanced). *Three hours.*
Course 19 must be preceded by Courses 8 and 10.
20. Hydraulic Machinery. Laboratory Work.
This course will be offered on completion of the hydraulic laboratory. § 56.
21. Design of Power Plants. *Three hours.*
Course 21 must be preceded or accompanied by Course 12.

114. ELECTRICAL ENGINEERING

Professor Patterson, Assistant Professor ————, Mr. Bailey, Dr. A. W. Smith, Mr. Morehouse.

FIRST SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Three hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.
3. Alternating Current Generators and Transformers. Lectures, recitations and laboratory work. *Four hours.*
Course 3 must be preceded by Course 2.
5. Design of Electrical Machinery and Appliances. Lectures, recitations and drawing. *Four hours.*
Course 5 must be preceded by Course 1 or 2.
7. Photometry of Electric Lamps. Lectures, recitations and laboratory work. *One hour.*
Course 7 must be preceded by Course 1 or 2.
9. Storage Battery Installations. Lectures, and laboratory work. *Two hours.*
11. Electric Generating Stations and Sub-Stations. Lectures. *One hour.*

Course 11 must be preceded by Course 1 or Course 2.
Course 11, omitted in 1904-1905, will be given in 1905-1906.

13. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Lectures and recitations. *Two hours.*
Course 13 must be preceded or accompanied by Course 1 or 2.

15. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 15 must be preceded or accompanied by Course 13.
Course 15, omitted in 1904-1905, will be given in 1905-1906.

SECOND SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Three hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 2 must be preceded by Courses 1, 2, 3, 4, and 5 in physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. Lectures, recitations and laboratory work. *Two hours.*
Course 4 must be preceded by Course 1 or 4.

6. Design of Electrical Machinery and Appliances. Drawing. *Two hours.*
Course 6 must be preceded by Course 5, of which Course 6 is the continuation.

8. Electric Railways. Lectures and recitations. *Two hours.*
Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. Lectures and reading. *Two hours.*

12. Distribution of Electricity. Lectures. *Two hours.*
Course 12 must be preceded by Course 1 or 2.

14. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 14 must be preceded by Course 13.

SUMMER SESSION

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Three hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. Course 1 is intended for students not candidates in electrical engineering.

115. **CHEMICAL ENGINEERING** (See *Chemistry*, § 104.)

116. NAVAL ARCHITECTURE AND MARINE ENGINEERING

Professor Cooley, Professor Sadler, Mr. Bragg.

FIRST SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
3. Naval Architecture. Strength of ships and preliminary design. *Two hours.*

   Course 3 must be preceded or accompanied by Course 2.
5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
6. Naval Architecture. Ship drawing and design. *Three hours.*
8. Marine Boilers. Lectures and recitations. *Two hours.*
10. Marine Engine and Boiler Drawing and Design. *One hour.*

SECOND SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
4. Naval Architecture. Stability, resistance and propulsion of ships. *Four hours.*
5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
7. Naval Architecture. Ship drawing and design. *Three hours.*
9. Marine Engines. Lectures and recitations. *Two hours.*
11. Marine Engine and Boiler Drawing and Design. *Two hours.*

PRIMARILY FOR GRADUATES

12. Experimental Tank Work. *Two hours.*
13. Ship and Engine Specifications. *Two hours.*
14. Pumping and Ventilation. *One hour.*
15. Advanced Reading. *Three hours.*
16. Advanced Drawing. *Five hours.*

Students wishing to specialize in Marine Engine and Boiler Design will elect Courses 6 and 7 as *three hours* each, and Courses 10 and 11 as *one hour* each.

SEQUENCE OF STUDIES

117. The work of the first year is the same for all regular students. At the end of the first year, the student makes his choice to continue in the civil engineering, the

mechanical engineering, the electrical engineering, the chemical engineering, or the marine engineering course. The student, in any course but chemical engineering, who desires to graduate in marine engineering, will elect the work in naval architecture and marine engineering in his *fourth* year, as specified in § 124.

There is a limited opportunity for electives in some semesters, and credits obtained in advance at entrance may leave a place for substitutions. After the first year the student may take work to the amount of *eighteen hours* per week, as arranged by the classification committee; but *he may wisely, in some cases, take a smaller number of hours,* if he can in that way do more thorough work. See "Rules Governing Election of Studies," § 96.

118. NEW ORDER OF STUDIES

The order of studies for students entering *after* commencement, 1905, and thereafter, is as follows. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond with this order.

One hundred and forty hours will hereafter be required for graduation, the thesis being omitted.

The order of studies for the first year is the same for all students.

First Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 1,	4 hours	Mathematics 2,	4 hours
*Language,	4 hours	*Language,	4 hours
†Chemistry 2,	4 hours	†Drawing 4,	4 hours
or		or	
Drawing 4,	4 hours	*Chemistry* 2,	4 hours
†English 1,	4 hours	†Shop Work 1,	4 hours
or		or	
Shop Work 1,	4 hours	*English* 1,	4 hours
‡Gymnasium Work,		‡Gymnasium Work,	
	16 hours		16 hours

---

*See note, page 60.

†The student taking Chemistry 2 the first semester will take Drawing 4 the second semester; likewise, the student taking English 1 the first semester will take Shop Work 1 the second semester; and *vice versa.*

‡See italics, § 94.

Sam Brown Fitzsimmons			*Crestline, O.*
Henry Eells Fletcher	M	43	*Detroit*
Samuel Robert Foote			*Ridgeway*
William Henry Foote	M	69	*Chicago, Ill.*
James Forbes	Mar	39	*Port Huron*
Albert Robinson Ford	M	33	*Jackson*
Eugene Peter Forrestel		8	*Buffalo, N. Y.*
Guy Thomas Foster	E	27	*Dayton, O.*
Frank Roscoe Fowles	M	69	*Auburn, Me.*
Maurice Winslow Fox	M	69	*Detroit*
Harold Robert Francis			*Muscatine, Ia.*
Harry Marshall Francis	E	91	*Hillsboro, N. Dak*
Albert Phillip Frapwell	S	19	*Greenland*
Glenn Alonzo Freeman	M	31	*Ionia*
Harold Blaine French	E	89	*South Haven*
Robert Wilton French	C	39	*Ann Arbor*
Harold Theodosius Fridborg		4	*Ishpeming*
Jesse Louis Frink	M	39	*Port Huron*
Harry Henry Frost			*Bay City*
Claude Jesse Fry	M	114	*Grand Rapids*
Kanaye Fujita			*Tokyo, Japan*
William Henry Fürst	C	35	*Chicago, Ill.*
James Stewart Fulton	M	110	*Steubenville, O.*
Stanley Lawrence Fyfe	M	95	*Saint Joseph*
Joseph Gale	C	86	*Corunna*
Ralph Galt	Ch	91	*De Kalb, Ill.*
Jésus Villegas Garcia	C	88	*Allende, Mexico*
Fernando Garcinava	C	50	*Purisima, Mexico*
John Carlisle Garrels	M	35	*Detroit*
Clyde Baker Gass	M	27	*Ypsilanti*
Julius Martin Gauss			*Ann Arbor*
Albert Lewis Gayer	E	102	*Flint*
Walter Scott Gearhart	S	66	*Clearfield, Pa.*
Edwin LeRoy Gemmill	M	108	*Sharpsville, Pa.*
Henry Georg	E	33	*Ann Arbor*
Ralph Wadhams George	M	76	*Ypsilanti*
Roy Wellington Gifford	M	74	*Cass City*
William Arthur Gifford	M	74	*Cass City*
John Orpheus Gilbert	E	103	*Medina, N. Y.*
Murray Havens Gilcrest		8	*Cheyenne, Wyo.*
Irving Leo Gill	C	42	*Grand Rapids*
Charles E. Gillette	E	33	*Niles*
Harry Finlay Gilman			*Duluth, Minn.*
Earl Mansfield Gladden	E	72	*Owosso*
Earl D. Glidden	M	101	*Mattawan*
Ralph Othniel Gooding	E	109	*Ann Arbor*
Irving Dean Goodwin	C	71	*Owosso*
Lee Reeves Goodwin	Ch	59	*Owosso*
Clay Winfred Gordon			*Fowlerville*

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	16 hours		13 hours

120. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Shop Work 2,	4 hours	Shop Work 3,	4 hours
or		or	
Shop Work 3,	4 hours	Shop Work 2,	4 hours
	18 hours		18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 3,	4 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 4,	3 hours	or	
		Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			17 or 16 hours

---

*See note, page 60.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Surveying 4,	2 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 8,	3 hours
or		or	
Mech. Engineering 5,	3 hours	Mech. Engineering 9,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
or		Law 1,	2 hours
Mech. Engineering 8,	3 hours		—
Marine Engineering 3,	2 hours		12 hours
	—		
	16 or 17 hours		

121. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Physics 3*b*,	2 hours	Physics 4,	2 hours
Drawing 6,	2 hours	Drawing 6,	2 hours
	—		—
	18 hours		18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	—		—
	18 hours		17 hours

---

*See note, page 60.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13	2 hours		
	—		—
	15 hours		12 hours

122.

CHEMICAL

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Mech. Engineering 1,	4 hours	Chemistry 3*a*,	4 hours
	—		—
	18 hours		18 hours

Summer Session

Chemistry 3*b*,	4 hours
Civil Engineering 11,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 5,	5 hours	Chemistry 28,	5 hours
Chemistry 7,	5 hours	Chemistry 38,	5 hours
Chemistry 33,	5 hours	Physics 3*c*,	4 hours
Mech. Engineering 4,	3 hours	Mech. Engineering 3,	4 hours
	—		—
	18 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	3 hours		—
Surveying 4,	2 hours		5 hours
Elect. Engineering 1,	4 hours		
	—		
	11 hours		

---

*See note, page 60.

Howard Kipp	C	34	*Greenville*
Arthur Collins Kirby		8	*New Bedford,*
George Alfred Kirley	C	66	*Sheldon, Vt.*
Charles Samuel Kisinger, B.S., *Adrian College*	C	73	*Adrian*
Landon Main Kitzmiller		8	*Greenville*
William Henry Klein	Ch	62	*Kansas City,*
William Edmund Kleiner		8	*Detroit*
William Kletzer	E	123	*Grand Rapids*
Frederick Evoy Kneip	C	60	*Ypsilanti*
William Clark Knight	Mar	61	*Westboro, Mas*
Clarence Carl Knipmeyer	E	39	*Higginsville,*
Edward Moore Knox	C	37	*Ann Arbor*
George Henry Knutson		14	*Muskegon*
Milton Harris Kramer	Ch	50	*Cadillac*
Clarence Henry Kremers	M	68	*Holland*
August William Kretzschmar		8	*Detroit*
†Ralph Levi Kryder, *a*		8	*Akron, O.*
George Hans Kuhn	C	38	*Chicago, Ill.*
Armen Stephen Kurkjian			*Grand Rapids*
Alvis Kusic		2	*Iroquois, N. Y*
Arthur Emil Kusterer	C	109	*Grand Rapids*
Rudolph Paul Kutsche		8	*Grand Rapids*
Strawn LaClair			*Ottawa, Ill.*
Albee Lovejoy Ladd			*Osceola, Wis.*
Lewis West Lamb	E	39	*Greenville*
George William Lamke	E	74	*Detroit*
Wilfred Elliott Lamm	E	22	*Danville, Ill.*
Walter Henry Lane	Mar	32	*Friendship, N.*
Ernest Frederick Lang		12	*Detroit*
Joseph Kerr Langfitt	M	26	*Allegheny, Pa.*
Jesse Raymond Langley			*Alva, Okla.*
Samuel Pierpont Langley	M	39	*Cleveland, O.*
Henry Larsen	M	76	*Eastlake*
Arthur Larson		8	*Waterloo, Ia.*
Daniel Whiting Lathrop	M	104	*Jackson*
Percy Mapes Lau			*Detroit*
†Clarence William Lawr, *a*	S	107	*Elk Rapids*
Elmer Claude Lawton	C	32	*Lawton, N. Y.*
George McNutt Lazell	C	81	*Big Rapids*
Arthur White Leet		8	*Fredonia, N. Y*
Ralph Ray Leffler	C	28	*Naperville, Ill.*
Arthur Edward Legg	Ch	38	*Coldwater*
J. P. Leland			*Hart*
Andrew Leuderink		27	*Kalamazoo*
Rudolph Lewen	C	71	*Detroit*
Frank Hamilton Lewis	E	82	*Flint*
George Eveline Lewis		16	*Ypsilanti*
Washington Bart Lewis	C	32	*Marquette*

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 6,	5 hours	Civil Engineering 1,	5 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 5,	3 hours
Naval Architecture 2,	2 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	2 hours	Marine Engineering 11,	2 hours
Marine Engineering 10,	1 hour		—
	—		19 hours
	17 hours		

125. OLD ORDER OF STUDIES

In order that students who entered *prior* to commencement, 1905, may receive as much advantage as possible from the re-arranged schedules, (See New Order of Studies, page 79), the following order of studies has been authorized. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond to this order.

Students working under the old order of studies who entered *prior* to commencement, 1904, are permitted a choice of preparing a thesis for graduation, or, of taking an amount of work elected from among the courses offered in the Department of Engineering but not required, the equivalent of a thesis, as may be determined by the head of the department in which the student seeks his degree.

CIVIL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908 **Second Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Surveying 1,	5 hours
	—	or	
	18 hours	Drawing 5,	4 hours
			—
			19 or 18 hours

---

*See note, page 60.

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Mineralogy 1,	2 hours	Physics 3*c*,	4 hours
Geology 6,	3 hours	Drawing 5,	4 hours
Surveying 2,	5 hours	or	
or		Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	18 hours		18 or 19 hours

Summer Session

Surveying 3, 6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	16 hours		13 hours

Class of 1907

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
†Drawing 5*a*,	2 hours	Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	15 hours		15 hours
Political Economy 2*c*, (Recommended)	4 hours	Geology 8, (Recommended)	3 hours
	19 hours		18 hours

Summer Session

Surveying 3, 6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	16 hours		13 hours

---

†Course 5*a* will be the same as Course 5 with the Stereotomy omitted. is Course will not be given after 1905-1906.

Class of 1906

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	2 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 8,	3 hours
Civil Engineering 5,	4 hours	Marine Engineering 9,	2 hours
Civil Engineering 6,	2 hours		—
Elect. Engineering 1,	4 hours		9 hours
	—		
	18 hours		

126. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
†Drawing 4,	4 hours	†Shop Work 3,	4 hours
or		or	
†Shop Work 2,	4 hours	†Shop Work 2,	4 hours
or		or	
†Shop Work 3,	4 hours	†Drawing 4,	4 hours
	—		—
	18 hours		18 hours

Summer Session

Shop Work 2,	4 hours
or	
Shop Work 3,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 3,	4 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 4,	3 hours	or	
	—	Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			—
			17 or 16 hours

---

*See note, page 60.
†One of these.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Surveying 4,	2 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 8,	3 hours
or		or	
Mech. Engineering 5,	3 hours	Mech. Engineering 9,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
or		Law 1,	2 hours
Mech. Engineering 8,	3 hours		—
Marine Engineering 3,	2 hours		12 hours
	—		
	16 or 17 hours		

Class of 1907

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
English 1*a*,	2 hours	Civil Engineering 1,	5 hours
Physics 3*c*,	3 hours	Mech. Engineering 4,	3 hours
Shop 3*a*,	2 hours	Mech. Engineering 7,	2 hours
Surveying 4,	1 hour	or	
Mech. Engineering 1,	4 hours	Mech. Engineering 5,	3 hours
	—	Elect. Engineering 1,	4 hours
	15 hours		—
			16 or 17 hours

Summer Session

——————,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Mech. Engineering 8,	3 hours
Mech. Engineering 7,	2 hours	or	
or		Mech. Engineering 9,	3 hours
Mech. Engineering 5,	3 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 12,	2 hours
Mech. Engineering 9,	3 hours	Law 1,	2 hours
or			—
Mech. Engineering 8,	3 hours		10 hours
Marine Engineering 3,	2 hours		
	—		
	16 or 17 hours		

Class of 1906

FIRST SEMESTER			
Civil Engineering 5,	4 hours	Mech. [illegible]),	3 hours
Mech. Engineering 6,	3 hours	or	
Mech. Engineering 8,	3 hours	Mech. Engineering 8,	3 hours
or		*Mech. Engineering 10,	2 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
*Mech. Engineering 10,	2 hours		—
	—		7 or 5 hours
	12 or 10 hours		

127. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
†Language,	4 hours	†Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Physics 3*b*,	2 hours
	—	Physics 4,	2 hours
	18 hours		—
			18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	—		—
	18 hours		17 hours

---

*One-half of the class.

†See note, page 60.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		
	15 hours		12 hours

Class of 1907

Third Year

Any student following this schedule who has completed eight hours of shop work will be considered as having fulfilled the shop requirements.

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	1 hour	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	17 hours		17 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		
	15 hours		12 hours

Class of 1906 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Elect. Engineering 3,	4 hours	Civil Engineering 5,	4 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 8,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 13,	2 hours	Elect. Engineering 14,	2 hours
	12 hours		12 hours

128. CHEMICAL

Class of 1908 **Second Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Chemistry 3*a*,	4 hours
	18 hours		18 hours

Summer Session

Chemistry 3*b*,	4 hours
Civil Engineering 11,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 5,	5 hours	Physics 3*c*,	4 hours
Chemistry 7,	5 hours	Chemistry 28,	5 hours
Chemistry 33,	5 hours	Chemistry 38,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
	19 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	3 hours		
Surveying 4,	2 hours		5 hours
Mech. Engineering 4,	3 hours		
Elect. Engineering 1,	4 hours		
	14 hours		

---

*See note, page 60.

Class of 1907 **Third Year**

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 5,	5 hours	Physics 3c,	4 hours
Chemistry 7,	5 hours	Chemistry 28,	5 hours
Chemistry 33,	5 hours	Chemistry 38,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
	—		—
	19 hours		18 hours

Summer Session

*——————,	4 hours
*——————,	2 hours
	—
	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	3 hours		—
Surveying 4,	2 hours		5 hours
Mech. Engineering 4,	3 hours		
Elect. Engineering 1,	4 hours		
	—		
	14 hours		

Class of 1906 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	3 hours	Chemistry 39,	5 hours
Surveying 4,	1 hour	Mech. Engineering 4,	3 hours
Chemistry 35,	2 hours		—
Mech. Engineering 1,	4 hours		8 hours
Mech. Engineering 3,	4 hours		
	—		
	14 hours		

129.

MARINE

Class of 1908 **Second Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
†Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Mech. Engineering 1,	4 hours
	—		—
	18 hours		18 hours

---

*To be announced later.

†See note, page 60.

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 3,	4 hours
Mech. Engineering 4,	3 hours	Mech. Engineering 7,	2 hours
Naval Architecture 1,	1 hour	Elect. Engineering 1,	4 hours
Naval Architecture 5,	2 hours	Naval Architecture 2,	2 hours
	—		—
	18 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 5,	3 hours	Surveying 4,	2 hours
Mech. Engineering 6,	5 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	2 hours	Marine Engineering 11,	2 hours
Marine Engineering 10,	1 hour		—
	—		13 hours
	16 hours		

Class of 1907 Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	3 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 3,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Naval Architecture 2,	2 hours	Mech. Engineering 7,	2 hours
	—	Naval Architecture 5,	2 hours
	17 hours		—
			17 hours

Summer Session

Metallurgy 1,	2 hours
Elect. Engineering 1,	4 hours
	—
	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 5,	3 hours	Surveying 4,	2 hours
Mech. Engineering 6,	5 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 3,	2 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	2 hours	Marine Engineering 11,	2 hours
Marine Engineering 10,	1 hour		—
	—		13 hours
	16 hours		

Class of 1906 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Surveying 4,	1 hour	Naval Architecture 4,	4 hours
Civil Engineering 5,	4 hours	Naval Architecture 7,	3 hours
Mech. Engineering 7,	2 hours	Marine Engineering 9,	2 hours
Naval Architecture 3,	2 hours	Marine Engineering 11,	2 hours
Naval Architecture 6,	3 hours		—
Marine Engineering 8,	2 hours		11 hours
Marine Engineering 10,	1 hour		
	—		
	15 hours		

REQUIREMENTS FOR GRADUATION

The Degree of Bachelor of Science

130. To earn the degree of Bachelor of Science in civil, mechanical, electrical, chemical, or marine engineering, the student must secure *one hundred and forty Hours of Credit** in a prescribed course of study, as given below, six hours of which must be earned in one Summer Session.† The diploma given indicates the line of study pursued. A time limit is not fixed; but four years is usually needed for the completion of the work required for the degree.

---

*For explanation of the term Hour of Credit see § 95, and for further information in regard to the courses prescribed for graduation, see §§ 98-116.

†The student entering *prior* to commencement 1904 must secure *one hundred and thirty Hours of Credit*, six hours of which must be earned in one Summer Session, and present a satisfactory *thesis*, or he may have the option stated in the second paragraph of § 125.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 6,	5 hours	Civil Engineering 1,	5 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 5,	3 hours
Naval Architecture 2,	2 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	2 hours	Marine Engineering 11,	2 hours
Marine Engineering 10,	1 hour		—
	—		19 hours
	17 hours		

125. OLD ORDER OF STUDIES

In order that students who entered *prior* to commencement, 1905, may receive as much advantage as possible from the re-arranged schedules, (See New Order of Studies, page 79), the following order of studies has been authorized. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond to this order.

Students working under the old order of studies who entered *prior* to commencement, 1904, are permitted a choice of preparing a thesis for graduation, or, of taking an amount of work elected from among the courses offered in the Department of Engineering but not required, the equivalent of a thesis, as may be determined by the head of the department in which the student seeks his degree.

CIVIL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Surveying 1,	5 hours
	—	or	
	18 hours	Drawing 5,	4 hours
			—
			19 or 18 hours

---

*See note, page 60.

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Mineralogy 1,	2 hours	Physics 3*c*,	4 hours
Geology 6,	3 hours	Drawing 5,	4 hours
Surveying 2,	5 hours	or	
or		Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	—		—
	18 hours		18 or 19 hours

Summer Session

Surveying 3,	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

Class of 1907

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
†Drawing 5*a*,	2 hours	Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	—		—
	15 hours		15 hours
Political Economy 2*c*, (Recommended)	4 hours —	Geology 8, (Recommended)	3 hours —
	19 hours		18 hours

Summer Session

Surveying 3,	6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

---

†Course 5*a* will be the same as Course 5 with the Stereotomy omitted. This Course will not be given after 1905-1906.

Class of 1906 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	2 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 8,	3 hours
Civil Engineering 5,	4 hours	Marine Engineering 9,	2 hours
Civil Engineering 6,	2 hours		—
Elect. Engineering 1,	4 hours		9 hours
	—		
	18 hours		

126. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908 **Second Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	**5 hours**	**Mathematics 4,**	**5 hours**
***Language,**	**4 hours**	***Language,**	**4 hours**
Physics 1,	**5 hours**	**Physics 2,**	**5 hours**
†Drawing 4,	**4 hours**	**†Shop Work 3,**	**4 hours**
or		**or**	
†Shop Work 2,	**4 hours**	**†Shop Work 2,**	**4 hours**
or		**or**	
†Shop Work 3,	**4 hours**	**†Drawing 4,**	**4 hours**
	—		—
	18 hours		18 hours

Summer Session

Shop Work 2,	4 hours
or	
Shop Work 3,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 3,	4 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 4,	3 hours	or	
	—	Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			—
			17 or 16 hours

---

*See note, page 60.
†One of these.

If a candidate for the degree of Master of Science desires to have his work count towards the degree of Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Marine Engineer, or Naval Architect the major subject must be taken in the course in which he took his bachelor's degree, and he must submit a satisfactory thesis before such degree as Engineer will be conferred.

The Degrees of Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Marine Engineer, and Naval Architect

138. The conditions under which the degree of Engineer may be obtained by graduates of this University in the Department of Engineering are as follows:

1. The candidate must furnish satisfactory evidence that he has pursued further technical studies along the lines in his profession the equivalent in amount of one year's work in the University. This work need not necessarily be consecutive. It may be done at the University or in *absentia.* In either case a prescribed course of study must be approved in advance by the Faculty. If the candidate resides at the University he can if he desires pursue his studies with a view to obtaining the degree of Master of Science on completion of the prescribed course of study. See § 128.

2. The candidate must have been engaged in professional work in positions of *responsibility* for at least one year since graduation, and must furnish a detailed account of his entire professional career one month before the date of the annual commencement at which he expects to receive the degree.

3. The candidate must prepare a satisfactory thesis on some engineering topic to be presented at the same time as the account of his professional experience, one month before commencement. The subject of the thesis must be approved in advance by the Faculty.

4. The candidate must, before beginning his work for the degree of Engineer, make formal application and register in the Department. A registration fee of $10 is required, which should accompany the application. A diploma fee of $10 is also required, which must be paid one month before Commencement.

Class of 1906 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Mech. Engineering 9,	3 hours
Mech. Engineering 6,	3 hours	or	
Mech. Engineering 8,	3 hours	Mech. Engineering 8,	3 hours
or		*Mech. Engineering 10,	2 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
*Mech. Engineering 10,	2 hours		—
	—		7 or 5 hours
	12 or 10 hours		

127. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 124 during his fourth year.

Class of 1908 **Second Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
†Language,	4 hours	†Language,	4 hours
Physics 1,	5 hours	Physics 2,	5 hours
Drawing 4,	4 hours	Physics 3*b*,	2 hours
	—	Physics 4,	2 hours
	18 hours		—
			18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	—		—
	18 hours		17 hours

---

*One-half of the class.

†See note, page 60.

140. REGISTER OF STUDENTS FOR THE YEAR 1905-6

RESIDENT GRADUATES

David Homer Clary, B.S. [Ch.E.], 1904, *Holder of Michigan Gas Association Fellowship*	*Monroeville, O.*
Mark Harris Gregg, B.S. [M.E.], 1904	*Ann Arbor*
Edward Lawrence Hogan, B.S. [E.E.], 1904	*Saint Johns*
Sydney Rumney Russel, B.S [M.E.], 1904	*Detroit*

CANDIDATES FOR AN ADVANCED DEGREE STUDYING IN ABSENTIA

Albert John Becker, B.S. [M.E.], 1903	*Grand Forks, N. Dak.*
Isaac De Young, B.S. [C.E.], 1898	*Sault Ste. Marie*
Charles Young Dixon, B.S. [C.E.], 1887	*Amherstburg, Ont.*
Arthur Holmes, B.S. [M.E.], 1904	*Detroit*
Willy Lehnartz, B.S. [M.E.], 1900, A.M., 1901	*South Milwaukee, Wis.*
George D. MacNaughton, B.S. [C.E.], 1901	*New York City, N. Y.*
Louis Ernest Seas, B.S. [C.E.], 1901	*New York City, N. Y.*
George Daniel Wuerful, B.S. [M.E.], 1900	*Toledo, O.*

UNDERGRADUATES*

NAME	COURSE	CREDIT	RESIDENCE
Allison Abbott		3	*Geneva, Ill.*
Arthur Alger Abel	M	44	*Ypsilanti*
Theodore Dillion Abeles		8	*Little Rock, Ark.*
George Ernest Ackerman	M	30	*Union City*
†George Fremont Ackley, *a*			*Litchfield*
Samuel Black Adams	Ch	14	*Cincinnati, O.*
Leon Barton Alexander			*Penn*
William Chisholm Allan	M	58	*Cleveland, O.*
Louis Heath Allen	Ch	94	*Grosse Ile*

---

*The letters in the column headed Course indicate the line of work the student has chosen to pursue: C denoting civil engineering; M, mechanical engineering; E, electrical engineering; Ch, chemical engineering; Mar, marine engineering; S, miscellaneous studies not leading to any degree. As students are not asked to make choice of course until the beginning of their second year, the absence of a letter indicates that the student is in his first year. The figures in the column headed Credit indicate the number of hours of work taken by the student prior to the beginning of the current academic year, 1904-1905, and completed without conditions, or credited to him on advanced standing. By an hour of work is meant the equivalent of one exercise a week for one semester. A dagger (†) preceding a student's name signifies that he also pursued studies, for the whole or a part of the year, in some other department of the University, indicated by an italic letter following the name, to-wit: *a*, Department of Literature, Science, and the Arts; *m*, Department of Medicine and Surgery; *l*, Department of Law; *p*, School of Pharmacy; *h*, Homœopathic Medical College; *d*, College of Dental Surgery.

Stanley Rindge Allen	S	69	*Grand Rapids*
William Thomas Alliger			*Dowagiac*
Courtenay Derby Allington	M	64	*Saginaw*
Maxwell Alpern	M	61	*Alpena*
Arthur Edwin Anderson			*Norway*
Charles Waldo Anderson	M	27	*Albion*
Edward Lowell Anderson		4	*Grosse Ile*
Lawrence Anderson			*Salt Lake City, U*
Niels Malander Anderson	S	61	*Fountain Green, U*
Graydon Roy Andrew	M	68	*Detroit*
Robert Edmund Andrews, A.B.	C	130	*Bay City*
Emmett Frank Annis		4	*Denver, Col.*
Harry Augustus Arnold		8	*Miles City, Mon*
Winfield K. Ash	M	43	*Saint Johns*
Robin Dee Ashley			*Lakeland, Fla.*
Frank Eugene Atkins		8	*Saint Johns*
Floyd Atkinson, A.B., *Mercer University*		13	*Stillmore, Ga.*
Robert Henry Atkinson	E	32	*Norvell*
Louis Evans Ayres			*Detroit*
Eric William Bacharach	M	88	*Cincinnati, O.*
Edward Kennedy Bacon	M	32	*Denver, Col.*
Gordon Harrington Bagg			*Ann Arbor*
John Samuel Bahm		4	*Imlay City*
Louis Rudolph Bailey	C	61	*Big Rapids*
Jesse Burdette Bain	C	47	*Kennedy, N. Y.*
Burton Adams Baker	E	65	*Lansing*
Ray Douglas Baker	C	30	*Fairfield*
Arthur Lee Baldwin	S	56	*Coldwater*
Harold Clark Baldwin			*Grand Rapids*
Melvin Dana Baldwin			*Grand Rapids*
Albert Powers Ball	E	34	*Grand Rapids*
Walter Taylor Ball			*Detroit*
Harold Gillespie Bandfield	E	102	*Portland*
Harry Pickands Banks		28	*Chicago, Ill.*
Newell Barnard	M	67	*Saginaw, West S*
Joel Martin Barnes	Ch	107	*Quincy*
Bird Lee Barns	E	89	*Petoskey*
Roy Louis Barns			*Delray*
Roland Benner Barrett	C	81	*Adrian*
Edgar Llewellyn Barrows			*Detroit*
William Kenneth Barry	E	8	*Rochester, N. Y*
John Sergeant Barstow	M	79	*Grand Rapids*
Carleton Fred Bartlett	Ch	18	*Ann Arbor*
Harry Skinner Bartlett	E	41	*Detroit*
John Warren Barton	E	69	*Sturgis*
Joseph L. Barton			*Detroit*

Charles Wesley Bartrem			*Ann Arbor*
Kenower Weimer Bash		4	*Huntington, Ind.*
Edwin Porter Beach			*Birmingham*
Walter Cooley Becker	Ch	44	*Chicago, Ill.*
Herbert Manning Beechinor	E	67	*Mount Vernon, N. Y.*
Roy Beechler	M	51	*Ithaca*
Anthony Joseph Bell		11	*Ishpeming*
John Wesley Bell	C	102	*Eastlake*
Robert Meredith Bellman	M	57	*Toledo, O.*
Marvin Jacob Beltz			*Akron, O.*
George Llewellyn Benbow	Ch	38	*Clayville, N. Y.*
Carl Michael Bergin		4	*Lowell*
Hyrum Manuel Berliant		12	*Chicago, Ill.*
Otto Carter Berry	M	116	*Glendale, O.*
Lawrence Howard Bertsch, A.B., *Indiana University*	M	41	*Cambridge City, Ind.*
Henry Edward Beyster			*Detroit*
Rolla Lavante Bigelow	C	105	*Owosso*
Harry Edmund Bilger, Ph.B., *Bucknell University*	S	45	*Curwensville, Pa.*
Ira Maxwell Birch	M	62	*Detroit*
Charles Arthur Bird		8	*Saginaw*
Harry Eugene Bird		4	*Youngstown, O.*
Carl Otto Bjork	C	22	*Chicago, Ill.*
David Theodore Bjork	C	96	*Chicago, Ill.*
Julius John Blair			*Defiance, O.*
Walter Kellogg Blakeslee	M	79	*Clinton, N. Y.*
†Frank Walker Bliss, *a*	C	41	*Niles*
Homer Newell Bliss	Ch	31	*Buffalo, N. Y.*
Frank Blitz		33	*Detroit*
Gustave Robert Bode			*Iron Mountain*
Ellis Moss Bonney	Ch	62	*Austin, Ill.*
Roy Edmund Boomer	C	37	*Ann Arbor*
Lloyd Logan Boone		8	*Montpelier, O.*
Luke Connable Bootes	C	23	*Jackson*
Robert Lee Boughton	Mar	30	*Battle Creek*
Stanley Ward Boughton			*Ann Arbor*
Winfield Sanford Bowman		14	*Kansas City, Mo.*
†Guy Bowser, *a*	S	14	*Goshen, Ind.*
Ford E. Boyd		8	*Fenton*
Kenneth Morrison Boyd		4	*Youngstown, O.*
Merlin Boyd	Ch	40	*Detroit*
Wilber Irving Boyles	M	39	*Charlotte*
Claude Brigham Boynton	C	81	*Muskegon*
Robert Hammond Boynton			*Batavia, N. Y.*
Samuel Craighead Brandon	M	71	*Detroit*
Benjamin Nathan Braun	M	76	*Ann Arbor*
Carl Wesley Braznell		4	*Stockdale, Pa.*

Howard Clay Brenizer		12	*Akron, O.*
Harry Leon Brightman	E	39	*Ann Arbor*
Percy Wellington Brilhart	C	57	*Indiana, Pa.*
Howard Gilbert Brinton		18	*Bradford, Pa.*
Henry Holbert Brodhead	M	31	*Buffalo, N. Y.*
Hugh Brodie	C	39	*Jacksonville, Fla.*
Joe Richardson Brooks		4	*Menominee*
Norton Townshend Brotherton	E	38	*Detroit*
Harry Arthur Brown	E	105	*Ann Arbor*
James Arthur Brown	M	119	*Sault Ste. Marie*
Oliver Gilbert Brown		30	*Honeoye, N. Y.*
Worley Jesse Brown	Ch	34	*Sterling, Ill.*
Albert Ernest Brugger	S	30	*Columbus, Neb.*
William James Bryan	Ch	94	*Cincinnati, O.*
Guy Valgean Budlong		8	*Sturgis*
Louis Anton Buese		8	*Republic*
Albert Comstock Burch	Mar	38	*Grand Rapids*
Robert Archibald Burns		8	*Saint Paul, Minn.*
Andrew Gano Burt, Jr.,	M	27	*Chicago, Ill.*
Frank Burton	Ch	37	*Detroit*
Louis Edward Burton	M	97	*Detroit*
Russell Conklin Burton		8	*Detroit*
Eli Franklin Bush	E	65	*Hudson*
Frank Jarvis Bush		8	*Bay City*
Carl Darwin Bushnell		27	*Kalamazoo*
Ray Elon Bushnell	S	31	*Joppa*
Albert Simpson Butler	E	45	*Honesdale, Pa.*
Louis Butler	E	60	*Kendall, Mont.*
Robert Horace Butters		8	*Ludington*
Mark Stone Cady		8	*Sault Ste. Marie*
Samuel Cline Cady			*Sault Ste. Marie*
Arthur Blaine Caldwell	C	28	*York, N. Y.*
George Hoffman Calhoun		24	*New Kensington, P*
Alexander Lagon Campbell	S	87	*Angell*
Harvey Blaine Campbell	M	40	*Battle Creek*
John David Campbell			*Royal Oak*
John Wood Campbell	E	68	*Napoleon, O.*
Emory Carhart	M	31	*Ann Arbor*
Orville Berton Carlisle,	C	96	*Shelby*
Charles Ketchum Carpenter	M	37	*Ithaca, N. Y.*
Dewey L. Carpenter		8	*Orion*
Howard Bruce Carpenter		8	*Pittsburg, Pa.*
Augustus Carrier, Ph.G., *Detroit Coll. of Pharmacy*	S	57	*Detroit*
Ralph Valentine Carrier			*Three Oaks*
John Michael Carroll		7	*Avon, N. Y.*
William F. Carroll		27	*Chicago, Ill.*
Edgar McMurray Carrothers	M	51	*Dewey, Ind. T.*
George Miller Carter	M	26	*Jackson*

Addison Reading Cary		8	*Detroit*
Roger Stephens Cathcart	M	34	*Bay City*
Reed John Caughey			*Erie, Pa.*
Albert Rodney Chandler		8	*Salem, Mass.*
Max Chandler			*Ann Arbor*
Rex Chandler			*Ann Arbor*
Henry Morrison Chapin	S	52	*Ashtabula, O.*
Claude Edward Chappell	C	52	*Charlotte*
Walter Charles			*Detroit*
Irwin Goodrich Chase	Mar	94	*Saint Louis, Mo.*
Charles Timothy Chenevert	M	14	*Defiance, O.*
Arthur Christensen			*Greenville*
Theodore Ecker Christian			*Lakewood, O.*
LaVern Clapp		8	*Vicksburg*
Edward Samuel Clark		8	*West Brattleboro, Vt.*
George Rogers Clark	E	21	*Ann Arbor*
George Winfred Clark	E	77	*Grand Rapids*
Louis Donald Clark		4	*Dexter*
Roy Clark		4	*Youngstown, O.*
William Dennison Clark	M	38	*Detroit*
Kinsley Napier Clarke	M	71	*Chicago, Ill.*
Frederick Humphrey Clary			*Monroeville, O.*
Carl Howard Clement	M	53	*New York, N. Y.*
Joseph Clune, Jr.			*Delray*
Charles Clark Clute	C	29	*Ann Arbor*
Elmer J. Codner	M	69	*Auburn, N. Y.*
Harry Lee Coe		36	*Seattle, Wash.*
Bela Laverne Cogshall	S	70	*Muskegon*
Harrie Newton Cole, A.B.	Ch		*Ann Arbor*
Howard Williams Coleman		8	*Bradford, Pa.*
Leon Christian Coller	E	96	*Detroit*
James Blaine Thomas Colman			*Medina, N. Y.*
Hervey Adolph Colvin	M	31	*Adrian*
Ernest Robert Conroy	C	42	*Northampton, Mass.*
Nathan Roy Cook	E	35	*Jackson*
Ross Miller Coomer	C	100	*West Bay City*
Thurlow Emmett Coon, A.B.	M	145	*Ann Arbor*
Roydon Watt Cooper		8	*Manistee*
Harold Frank Coppes		12	*Nappanee, Ind.*
Herbert Rhemson Cornell	E	45	*Mount Clemens*
Harold Hawley Corson	C	35	*Birmingham*
Harry Morris Courtright		10	*Bay City*
Clyde Curtis Cox		7	*Traverse City*
Edward James Creighton	C	70	*Franklin, Pa.*
Cris Cron	E	70	*Manistee*
Fred Rudolph Cron	C	74	*Manistee*
Charles Henry Croom	E	78	*Jackson*
Harold B. Culbertson	M	62	*Charlotte*

James William Culhane			*Port Austin*
Frank Vincent Cummins			*Jackson*
Peter Augustine Cummins			*Detroit*
Claude Clayton Curtis	M	36	*Battle Creek*
John Spencer Curtis	Ch	35	*Pueblo, Col.*
Martin Hubert Daane	C	34	*Grand Rapids*
Allen Lynn Darr	C	147	*Tacoma, Wash.*
Thomas M. Darrah		11	*Toronto, O.*
Lynn Stephen Darrow		4	*Los Angeles, Cal.*
Thomas Richard Davidson			*Lowell*
Thomas Stephen Davies	M	31	*Detroit*
Cassius Miles Davis		8	*Detroit*
Philip Chapin Davis	M	85	*Kalamazoo*
Samuel James Davison			*Alpena*
Clarence Whiting Davock	M	39	*Detroit*
Archie Smith Day	E	24	*Youngsville, Pa.*
George Berry Dean	E	55	*Nashville*
Arthur James Decker	C	110	*Marlette*
William Harmon DeGraff	M	35	*Detroit*
Joseph Peter DeKorn		20	*Kalamazoo*
Luis Fanor de Lemoine, Jr.	E	44	*Galt, Ont.*
Frank Alexander DeLisle		12	*Delray*
Isaac DePagter	C	73	*Grand Rapids*
James DePree	C	40	*Holland*
M. Jay DePuy		8	*Saline*
Charles Dettweiler	C	43	*Leavenworth, Kan*
Rollo William Detwiler	M	88	*Owosso*
John Henry DeVisser	M	52	*Kalamazoo*
Ralph Devries	S	32	*Holland*
Theodore DeVries		8	*Drenthe*
Henry Cadby Dewey	C	112	*Shortsville, N. Y.*
Edward Stanton Dibble	E	34	*Detroit*
Harold Shields Dickerson	E	112	*Grand Rapids*
William Henry Distin, Jr.	Mar	93	*Detroit*
Marvin Warde Ditto		8	*South Butte, Mon*
Wilson Irving Doan	E	15	*Ann Arbor*
Otto Henry Doane	M	46	*Forest Hill*
Charles Walter Dobbins		4	*Marshall*
Robert Moxley Dodge	C	28	*Moscow, N. Y.*
Everett Eugene Dorris	E	33	*Quincy*
Henry James Dotterweich		4	*Olean, N. Y.*
LaVerne Richard Dougherty			*Three Rivers*
Roy Atwater Dowd			*Hartford*
†Chauncey Herbert Dowman, *a*			*West Springfield,*
Edgar Enos Down			*Detroit*
Herman Otto Dratz	S	77	*Muskegon*
Henry Lane Dresser	C	37	*Ann Arbor*
Carl Lavern Driggs		4	*Palmyra*

Howard Blaine Drollinger	E	36	*Grand Rapids*
Alfred Clayton Duckett			*Ann Arbor*
Harold DuCharme		3	*Detroit*
Robert William Duncan			*Ann Arbor*
John Adams Dunford, B.S., *Michigan Agricultural Coll.*	E	42	*Long Rapids*
Byron William Dunham, B.S., *Kalamazoo College*	M	63	*Oshtemo*
Martin James Dunkirk			*Grand Haven*
William Albert Dunkley		11	*Fredonia, N. Y.*
Arthur Fink Dunnebacke	M	35	*Lansing*
Frank Adelbert Dwelle	E	40	*Jackson*
Edward Daniel Eagle			*Friendship, N. Y.*
George Lewis Earle	M	26	*Detroit*
Roy J. Easton	M	32	*Ann Arbor*
Oscar Alfred Eberbach	Ch	73	*Ann Arbor*
William Philip Edmunds			*Youngstown, O.*
Harry Darwin Edwards		8	*Williamston*
Ralph Lewis Edwards	C	74	*Hinsdale, Ill.*
Walter Emanuel Ehrman	C	82	*Chicago, Ill.*
Hubert Charles Ellis			*Milwaukee, Wis.*
Robert Bisbee Elsworth	M	102	*Wayne*
Arthur Dwight Elwell	M	57	*Standish*
Everett Sprague Elwood		8	*Starkville, N. Y.*
Seth Harrison Ely	E	66	*Rutherford, N. J.*
Warren Edwards Emley	Ch	69	*Philadelphia, Pa.*
Frank Christopher Engelhart		8	*Erie, Pa.*
Baltus Fred Erb		8	*Royal Oak*
Albert de Valois Evans		4	*Cheboygan*
Walter Leonard Eyke	E	33	*Muskegon*
Charles Reed Faben	M	37	*Toledo, O.*
George Stokes Fanning	C		*Detroit*
Gereau Knox Faulds			*Amsterdam, N. Y.*
Galusha Hamilton Fay	M	57	*Los Angeles, Cal.*
John Morton Fedewa	C	29	*Ann Arbor*
John Alexander Ferguson, A.B.,	Ch	160	*Detroit*
John Ashley Ferguson	S	100	*White Pigeon*
Albert Frederick Fillerup	S	85	*Vineyard, Utah*
Carl Herman Frederick Fischer	Ch	108	*Cincinnati, O.*
Harold Clinton Fish	C	38	*Allegan*
Clarence Andrew Fisher	C	73	*Bay City*
John Brewill Fisher	E	78	*Detroit*
Martin Rankin Fisher	C	71	*Inkster*
John Arthur Fishleigh, Jr.	C	34	*Chicago, Ill.*
Walter Turner Fishleigh, A.B.,	C	128	*Chicago, Ill.*
William James Fitzgerald			*Detroit*
Victor Benedict Fitzpatrick	E	32	*Ann Arbor*

FRANK W. GUERNSEY. Co. Surveyor, '73-'81. Co. Supt. Sch. Plymouth Co., Ia., '78-'80. Cash. Nat. Bank, '90-8. Co. Treas., '98-9. Asst. Cash. Garfield Co. Bank, '04 to date. *Pomeroy, Wash.*

WILLIAM J. HEAD. Sturgeon Bay and Lake Mich. Ship Canal, '71-2. Secy. and Treas. Ferd. Heim Brewing Co., Kansas City, Mo., '72-6. Malster. *87 Rush St., Chicago, Ill.*

†JOSEPH W. PERKINS. Chf. Dftsman Bldg. Dept. A. T. & S. F. R. R. '87-9. Architect, '89-'96. Asst. State Archt. Kan., '92-4. Archt. City of Mexico, '96. *Mexico City, Mex.*

†CLARENCE M. STEVENS. Co. Surveyor. Asst. Supt. Yellowstone Park. Dept. U. S. Mineral Surveyor. City Engineer. *Mt. Clemens, Mich.*

†WILLIAM VOIGHT, JR. U. S. Asst. Engr. Lake Survey. City Engr. Detroit. Asst. Engr. A. T. & S. F. R. R., '76-'83. Sec. and Treas. Home Brewing Co. *661 St. Aubin Ave., Detroit, Mich.*

†JOSIAH W. WILLIS. U. S. Lake Survey, '71. With Bay City *Chronicle,* '73. Contractor and Builder, '73-4. Prin. of School, Bay City, '74-5. Prin. of Pub. Sch. 48, Buffalo, '78-'99. *47 12th St., Buffalo, N. Y.*

*CHAS. M. WINCHELL. U. S. Asst. Engr. Lake Survey, '74-8. Do. Miss. Riv. Com., '78-'85, '88-'95. Do. Surveys of Pass Cavallo and Arkansas Pass, Tex., '86-7. Engr. Street Dept. St. Louis, '96. U. S. Asst. Engr. Deceased.

1874.

HORACE BARNARD. Co. Comr., '87-'90. Pres. Frederick Mill. Co., '85-'91. Dep. Co. Treas., '97-'01. Farmer and Surveyor. *Frederick, S. Dak.*

†CLARENCE O. BEAN. Asst. Engr. N. P. R. R., '80-3. City Engr. Tacoma, '83. Engr. Tacoma Land Co. Civ. Engr. *Tacoma, Wash.*

CHAS. L. DOOLITTLE. Sc.D., '96. F. Am. Assoc. for Adv. of Sci., Am. Philosophical Soc., Astron. and Astrophysical Soc. of Am. Asst. U. S. Northern Boundary Survey, '73-5. Prof. Mathematics and Astron., Lehigh Univ., '75-'95. Do. Univ. of Penn., '95-8. Prof. Astronomy and Director of Astron. Observatory, U. of Penn., '98-'05. *Upper Darby, Penn.*

†JAMES M. EVERETT. M.D. (Rush Med. Coll.) '77. Physician. *De Kalb, Ill.*

†HORACE HOLMES. U. S. Lake Survey, '74. U. S. Harbor Imp., '75-6. Asst. Engr. M. C. R. R., '82. Civil Engr. *Detroit, Mich.*

†JULIAN S. HULL. Engr. Natl. Bd. Underwriters, '74-5. Asst. Engr. N. P. R. R., '75-7. Do. D. & R. G. R. R., '77-'80. Asst. Chief Engr. Tex. S. F. & No. R. R., '80-2. Div. Engr. Mexican Cen-

SCHEDULE OF EXAMINATIONS

In 1905-1906 the Examination Periods begin as follows: First Semester, Friday, Feb. 2: Second Semester, Friday, June 8

Time of Exercise*	Monday 8	Monday 9	Monday 10	Monday 11	Monday 1	Monday 2	Monday 3
Time of Examination	Monday 8–10	Tuesday 8–10	Thursday 8–10	Friday 8–10	Thursday 4–6	Tuesday 2–4	Wednesday 2–4
Time of Exercise	Tuesday 8	Tuesday 9	Tuesday 10	Tuesday 11	Tuesday 1	Tuesday 2	Tuesday 3
Time of Examination	Saturday 8–10	Wednesday 8–10	Monday 2–4	Thursday 2–4	Friday 4–6	Saturday 4–6	Friday 2–4
Time of Exercise	Wednesday 8	Wednesday 9	Wednesday 10	Wednesday 11	Wednesday 1	Wednesday 2	Wednesday 3
Time of Examination	Saturday 10–12	Monday 10–12	Friday 10–12	Wednesday 10–12	Monday 4–6	Tuesday 10–12	Thursday 10–12

*** Note: By the Time of Exercise is meant the time of the first exercise of the week in any given course. For example: If a course is given Monday at 3, Wednesday at 8, and Friday at 10, it is said to be given Monday at 3. By referring to Monday 3, in the schedule, it will be seen that the examination falls upon Wednesday 2-4. Examinations in shop work are held Saturday 2-4, Tuesday 4-6, and Wednesday 4-6. For further information concerning shop examinations consult the Superintendent of shops.**

140. REGISTER OF STUDENTS FOR THE YEAR 1905-6

RESIDENT GRADUATES

David Homer Clary, B.S. [Ch.E.], 1904, *Holder of Michigan Gas Association Fellowship*	*Monroeville, O.*
Mark Harris Gregg, B.S. [M.E.], 1904	*Ann Arbor*
Edward Lawrence Hogan, B.S. [E.E.], 1904	*Saint Johns*
Sydney Rumney Russel, B.S [M.E.], 1904	*Detroit*

CANDIDATES FOR AN ADVANCED DEGREE STUDYING IN ABSENTIA

Albert John Becker, B.S. [M.E.], 1903	*Grand Forks, N. Dak.*
Isaac De Young, B.S. [C.E.], 1898	*Sault Ste. Marie*
Charles Young Dixon, B.S. [C.E.], 1887	*Amherstburg, Ont.*
Arthur Holmes, B.S. [M.E.], 1904	*Detroit*
Willy Lehnartz, B.S. [M.E.], 1900, A.M., 1901	*South Milwaukee, Wis.*
George D. MacNaughton, B.S. [C.E.], 1901	*New York City, N. Y.*
Louis Ernest Seas, B.S. [C.E.], 1901	*New York City, N. Y.*
George Daniel Wuerful, B.S. [M.E.], 1900	*Toledo, O.*

UNDERGRADUATES*

NAME	COURSE	CREDIT	RESIDENCE
Allison Abbott		3	*Geneva, Ill.*
Arthur Alger Abel	M	44	*Ypsilanti*
Theodore Dillion Abeles		8	*Little Rock, Ark.*
George Ernest Ackerman	M	30	*Union City*
†George Fremont Ackley, *a*			*Litchfield*
Samuel Black Adams	Ch	14	*Cincinnati, O.*
Leon Barton Alexander			*Penn*
William Chisholm Allan	M	58	*Cleveland, O.*
Louis Heath Allen	Ch	94	*Grosse Ile*

---

*The letters in the column headed Course indicate the line of work the student has chosen to pursue: C denoting civil engineering; M, mechanical engineering; E, electrical engineering; Ch, chemical engineering; Mar, marine engineering; S, miscellaneous studies not leading to any degree. As students are not asked to make choice of course until the beginning of their second year, the absence of a letter indicates that the student is in his first year. The figures in the column headed Credit indicate the number of hours of work taken by the student prior to the beginning of the current academic year, 1904-1905, and completed without conditions, or credited to him on advanced standing. By an hour of work is meant the equivalent of one exercise a week for one semester. A dagger (†) preceding a student's name signifies that he also pursued studies, for the whole or a part of the year, in some other department of the University, indicated by an italic letter following the name, to-wit: *a*, Department of Literature, Science, and the Arts; *m*, Department of Medicine and Surgery; *l*, Department of Law; *p*, School of Pharmacy; *h*. Homœopathic Medical College: *d*, College of Dental Surgery.

*CHARLES A. MARSHALL. M. Am. Soc. C. E. Bridge Dept. Edge Moor Iron Co., '76-'80. Const. Engr. Cambria Iron Co., '81-4. Engr. of Tests, C. I. Co., '84-9. Drowned in Johnstown Flood, May, 1889.

JOSEPH RIPLEY. M. Am. Soc. C. E., do. Western Soc. of Engrs., do. Mich. Engr. Soc. Surveyor Chippewa Co., '76-7. U. S. Asst. Engr. St. Mary's River, '77-'05. U. S. Asst. Engr. Survey Birmingham Canal, Ala., '97. Gen'l Supt. St. Mary's Falls Canal, '98-'05. *334 Portage Ave., Sault Ste. Marie, Mich.*

†JOHN D. SANDERS. Teaching, '76-7. D'ftsman and Asst. Insp. Edge Moor Iron Works, '77-8. Asst. Supt. Mine La Motte Lead Mines and Wks., '78-9. Supt. do. '79-'97. Asst. Mgr. Solvay Process Co., Detroit, '97 to date. *Detroit, Mich.*

JOHN M. SCHAEBERLE. M.S. (Hon. U. of M.), '93. LL.D. (Univ. of Cal.), '98. Private Asst. to Prof. Watson (U. of M.), '76-8. Asst. in Observatory, U. of M., '78-'85. Acting Asst. Prof. Astron., '85-6. Instructor do., '86-8. Astronomer Lick Observatory, Cal., '88-'97. Acting Director, '97-8. Astronomical Investigator. *502 Second St., Ann Arbor, Mich.*

†JONATHAN C. SHEPARD. Engr. U. P. R. R., '76-'81. Do. U. S. River Imp. Civil Engineer. *Escondido, Cal.*

LESTER H. STRAWN. Attorney at Law. *Ottawa, Ill.*

†ALONZO J. TULLOCK. M. Am. Soc. C. E. Engr. and Proprietor Mo. Valley Bdge. and Iron Works. *Leavenworth, Kan.*

1877.

OSMER H. AIKINE. M. Mich. Engr. Soc. First Asst. Engr. M. P. G. & D. R. R., '80. Div. Engr. B. M. R. R. in Neb., '87. Asst. Gen'l Mngr. Magna Charta Silver Min. and Tunnel Co., '91-3. U. S. Dep. Mineral Surveyor, '79 to date. Mining Engr. the Raymond Consolidated Mines Co., '03 to date. *Gunnison, Colo.*

HOLLAND W. BAKER. M. Am. Soc. C. E. U. S. Asst. Engr. Miss. and Mo. River Imp. Cic. Engineer. *Kirkwood, Mo.*

WILLIAM BURTON. A.B. (Iowa Coll.), '75. A.M. (Iowa Coll.), '80. U. S. Dep. Surveyor, Co. Surveyor and Notary Public. *Garden Valley, Eldorado Co., Cal.*

BENJAMIN C. RICHARDS, (Civil).

EDWARD J. SNOVER. Treas. Owen & Co., Ltd., from '02 to date. *529 Third Ave., Detroit, Mich.*

†JAMES E. TURTLE. U. S. Asst. Engr. Riv. Imp., '77-8. Do. Muscle Shoals Canal, '79-'82. Do. Miss. Riv. Imp., '83-6. Do. Harbor Imp. and Imp. of Rivers in Fla. and Ala. *Warrington, Fla.*

1878.

*WALTER S. ABEL, (Mining). Assay Office, San Francisco. Died at San Francisco, May, 1887.

George F. Allmendinger. Farmer, '79-'82. Mngr. Central Milling Co., '83-'00. Mngr. Delhi Mills, '85-6. Mngr. A. A. Milling Co., '92-7. Sec'y and Treas. Mich. Milling Co., '00-'05. Pres't Mich. State Millers' Assn., '00-'01.
1035 S. Main St., Ann Arbor, Mich.

***Clarence O. Arey.** M.D. (Univ. of Pa.). In Charge Bacteriological Lab., Gov. Exp. Sta., '93. Architect. Died at Cleveland, O., August, 1896.

James D. DuShane. U. S. Asst. Engr. in Charge of Miss. River Imp. from St. Paul to Mo. River, '78 to date.
U. S. Engr. Office, Army Bldg., St. Paul, Minn.

Wm. V. Grove. D.D.S. (Ohio Coll.), '81. Dentist.
610 Elicott Square, Buffalo, N. Y.

†**John K. Hanson.** Civil Engineer. *Concord, Neb.*

***John B. Johnson.** M. Am. Soc. C. E. Do. Am. Soc. Mech. E. U. S. Asst. Engr. Lake Survey, '78-'80. Do. Miss. Riv. Com., '80-3. Prof. Civ. Eng., Wash. Univ., '85-'99. Dean Dept. Mech. and Eng., Univ. of Wis. Deceased.

Timotheus Josenhans. Architect. *Seattle, Wash.*

Henry W. Judd, (Mining). Banker for 22 years. At present, Broker. Mem. Cleveland Stock Exchange.
580 E. Prospect St., Cleveland, O.

Eugene G. Mann, (Mining). Druggist.
213 S. Main St., Ann Arbor, Mich.

Seymour T. Morse. A.B. (U. of M.), '01. Farming and Teaching. Also Insurance Solicitor. *1025 Vaughn St., Ann Arbor, Mich.*

Charles F. Owen. Chief Engr. on Steamboat, '78-'82. Engr. Harrison St. Pumping St. *6523 Jackson St., Chicago, Ill.*

***James Sanderson.** Asst. Engr. T. & A. A. R. R. Died at Bay City, Mich., September, 1885.

Ossian C. Simonds. M. Western Engr. Soc. Supt. Graceland Cemetery, '80-'03. Landscape Gardner do., '80-'05. Mem. Bd. of Mngrs. do., '00-'05. Landscape Gardener. O. C. Simonds & Co., '02-'05. *Buena Ave., Chicago, Ill.*

Frank L. Sizer. M. Montana Soc. of Engrs., do. Am. Inst. of Min. E., do. Nat'l Geographic Soc., do. Geological Soc. of Washington. D'ftsman, U. S. Survey Gen'l, Colo., '80-1. Chf. Clerk U. S. Survey Gen'l, Mont., '82-3. Gen'l Mngr. Empire Min. Co., '86-8. Gen'l Mngr. Helena Pressed Brick Co., '88-'90. Chief of Office Irrigation Inquiry, Dept. of Agrl., Washington, D. C., '93. Chf. Min. Engr. for W. A. Clark, Butte, Mont., '98-'01. Gen'l Mngr. Rosario Mines, Mexico, '01-3. Do. Mo. and Mont. Gold Mng. Co., '03-4. Do. Whitlatch Mng. Co., '04 to date. Also Consulting Mining Engineer. *731 Stuart St., Helena, Mont.*

Hiram E. Terry. M. Mich. Eng. Soc. Co. Surveyor, '79-'80. Asst. Engr. D. L. & N. R. R., '81. Prin. Sch. Maple Rapids, '81-3. Do. Central Sch. E. Saginaw, '84-9. Asst. City Engr., Saginaw, '89-'96. City Engr., do., '96-'02. Civil Engineer, '02 to date.
721 Holland St., Saginaw, Mich.

†Evert VanPelt. Engr. Leavenworth & Topeka R. R. Civ. Engr. *Yoakum, Tex.*

†Andrew J. Wenzell. U. S. Asst. Engr. Harbor of Refuge, Sand Beach, '79. Asst. Engr. F. & P. M. R. R., M. C. R. R. and G. R. & I. R. R. Div Engr. C. M. & St. P. R. R. Chief Engr. S. F. & H. R. R. Engr. Detroit and Belle Isle Bridge. Chief Engr. L. S. & I. R. R., '92-3. Engr. Union Trust Co. Bldg., Detroit. Chief Engr. D. & M. R. R., '94-5. Asst. Engr. C. & N. W. Ry. *Butterfield, Minn.*

†Sidney B. Wight, (Mining). Assayer and Chemist, Wyandotte Silver Works, '78. Do. Detroit and Lake Superior Copper Works, '79-'82. Do. Vulcan Ice Co., Newberry, '82-6. Supt. Land Dept. D. M. & M. R. R. and Peninsular Land Co., '86-'91. Secy. to Prest. M. C. R. R. Asst. Purchasing Agt. M. C. R. R. *786 Congress St. E., Detroit, Mich.*

1879.

Charles S. Beadle. Div. Res. and Loc. Engr. A. T. & S. F. R. R. Chief Engr. K. C. & E. R. R. Loc. Engr. C. & St. L. Electric R. R. City Engineer. *Sault Ste. Marie, Mich.*

Charles C. Brown. M. Am. Soc. C. E., do. Am. Soc. for Testing Materials. 1st V. Pres. Am. Soc. Mun. Imp.; Secy. Nat'l Assoc. Cement Users; Secy. Ind. Eng. Soc.; Pres. Indianapolis Technical Club. U. S. Asst. Engr. Lake Survey, '79-'82. Asst. Engr. N. Y. State Survey, '82 and '86. Prof. Civ. Eng., Rose Polytechnic Inst., '83-6. Prof. Civ. Eng., Union College, '86-'93. Cons. Engr. N. Y. State Bd. of Health, '87-'93. City Engr., Indianapolis, '94-5. Asst. City Engr., Omaha, Neb., '96-7. Editor *Municipal Engineering*, Municipal Eng. Co., Editorial Writer, '95. Editor-chief, '00. Editor of "Directory of Am. Cement Industries," and "Handbook for Cement Users." Consulting Engr. in Municipal and Sanitary Work and Cement from '95 to date. *28 S. Meridan St., Indianapolis, Ind.*

†Charles S. Henning. Res. and Div. Engr. A. & P. R. R., '80-3. Gen'l Rdmstr. do. '83-4. Chief Engr. J. C. K. & O. R. R., '85. Prest. Cherikee Coal Mining Co. *Cherokee, Kan.*

*Brayton D. King, (Mining). Died at Morgan Park, Ill., April, 1894.

†Horatio T. Morley. Shipbuilder and Vessel Owner. *Detroit, Mich.*

Irving K. Pond, (Civil). Fel. Am. Inst. Architects. Architect. *21 Vanburen St., Chicago, Ill.*

John C. Quintus, (Mining). M. Am. Soc. C. E. U. S. Asst. Engr. River and Harbor Imp., '79-'94. Prin. Asst. U. S. Engr., '94 to date. *540 Federal Bldg., Buffalo, N. Y.*

E. Fred Wood, (Mining). M. Am. Inst. Min. Eng., do. Iron and Steel Inst., do. Am. Chem. Soc., do. Am. Elec. Chem. Soc., Eng. Sec. Western Penna. Chemist Union Iron and Steel Co., Chicago. Do. Pittsburg Bessemer Steel Co. Supt. Bessemer Dept. Carnegie Steel Co. Asst. Supt. Homestead Steel Wks. 1st V. Pres. International Nickel Co., '02 to date.
43 Exchange Place, New York City, N. Y.

1880.

John Ayers, (Mining). Cashier Nat'l Bank of W. Ark., '80-2. Hardware Merchant, firm Ayers & Co., '83-'02. Secy. and Treas. Ketcham Iron Co., '00 to date. Do. Webber-Ayers Hardware Co., '02 to date. Do. Ayers Plumbing Co., '05 to date.
800 N. Twelfth St., Fort Smith, Ark.

*Joseph A. Beaumont. Died at Armordale, Kan., March, 1885.

Samuel F. Beaumont, (Mining). Civil and Mining Engineer.
St. Louis, Mo.

Edward S. Davis. U. S. Asst. Engr. Miss. Riv. Surveys, '80-3. Co. Surveyor, Hill Co., Texas, '79-'96. *Hillsboro, Tex.*

George L. Fisher. Architect. *Omaha, Neb.*

Cicero D. Hill. M. Western Soc. of Engrs. Asst. Engr. C. M. & St. P. R. R. Do. D. & R. G. R. R. Do. Hennepin Canal. Do. Dept. Pub. Wks., Chicago. Shief Engr. Sewers, Bd. Local Improvements, Chicago, '98-'05. *808 Farwell Ave., Chicago, Ill.*

†Frank P. Satterlee, (Mining). Assayer. Medical Student, '99.
San Francisco, Cal.

1881.

George A. Brown. M. Ill. Assoc. of C. E. and Surveyors. Instrument man P. McK. & Y. R. R., '81-2. Res. Engr. T. H. & L. R. R., '82-3. Junior Mem. of Engr. Firm, C. C. & G. A. Brown, '83-5. Asst. Engr. S. P. Co., '86-9. U. S. Asst. Engr. (Irrigation Wk.), '89. Senior Mem. Engr. Firm Brown & McCullough, '90-6. Secy. and Mngr. Public School Pub. Co., '97 to date. *306 E. Graham St., Bloomington, Ill.*

†Randolph W. Brown. Merchant. *Rochester, (?) Minn.*

†John W. Dorst. Asst. Engr. D. & R. G. R. R., '81. U. S. Asst. Engr. Miss. Riv. Com., '81-5. Manufacturer.
863 Columbus Ave., New York, N. Y.

†William W. Follett. M. Am. Soc. C. E. Div. Engr. N. O. & N. E. R. R., '81-3. Engr. in Charge Red Riv. Bridge, Shreveport, La., '83-5. Div. and Loc. Engr. A. T. & S. F. R. R., '86-'90. Irrigation Survey and U. S. Geological Survey, '89. Asst. Engr. Artesian and Underflow Investigation, '90-1. Cons. Engr. International (Water) Bndry. Com. U. S. and Mexico, '96-9.
El Paso, Tex.

John E. Hathaway. Contractor.
106 Mason St., Milwaukee, Wis.

†David E. Hoover. Engr. Sanitary Dept. Pullman, Ill., '81. Asst. Engr. Mex. Central R. R., '82. Surveyor and Vineyardist.
Keuka, N. Y.

†George A. Lederle. M. Am. Soc. C. E. Asst. Engr. Bismark Bridge, '81-2. Do. Snake River Bridge, '82-3. Engr. in Charge Keithsburg Bridge, '85. Res. Engr. Omaha Bridge, '86. Do. Willamette Bridge, '87. Do. Snake River Bridge, '88. Civil Engineer and Contractor, Firm of Christie and Lowe.
Sabine Pass, Tex.

†George W. Lilly. A.B. (Ohio Wesl.). Asst. Engr. Pullman, Ill., '81. Do. W. & L. E. R. R. Bdge., Toledo, '81. Do. S. C. & P. R. R. Bdge. over Mo. Riv., '82-4. Do. Queen and Crescent Ry. and private practice, '83-5. Legislature N. Dak., '89-'90. Atty. at Law, Ashley, N. Dak., '84-'95. Asst. City Engr. Columbus.
216 E. Eleventh Ave., Columbus, O.

W. Clayton Miller. Resident Mgr. Empire State Idaho Mining and Dev. Co., '93-'03. Asst. Gen'l Mgr. Federal Mining and Smelting Co., Wallace, Ida., '03 to date.
Box 1766, Spokane, Wash.

1882.

Benjamin Douglas. M. Am. Soc. of C. E., do. Am. Ry. Engr. and Maintenance of Way Assoc., do. Mich. Engr. Soc., do. Detroit Engr. Soc. Asst. Engr. Detroit Bdge. and Iron Wks., '82-5. Bdge. Engr. M. C. R. R., '85-'05. Consulting Engr., '95-'05.
c/o M. C. R. R., Detroit, Mich.

†Malcolm W. Edgar. D'ftsman Mich. Car Co., '82-'93. Asst. Mngr. Union Car Co., '93-7. With Detroit Car Co., '97 to date.
Detroit, Mich.

†Mary Hegeler (Mrs. Paul Carus). *La Salle, Ill.*

William H. McEwan. Asst. Engr. D. L. & N. R. R., '82-4. Lumber Mnfgr., Seattle Cedar Lumber Mfg. Co.
P. O. Box 600, Seattle, Wash.

Samuel C. Weiskopf. M. Am. Soc. C. E. Asst. Engr. C. M. & St. P. R. R., '83-6. Inspecting and Bdge. Engr., Pittsburg, Pa., '86-'91. Consulting Engr. Carnegie Steel Co., '91-3. Do. Private Practice, '93-9. Chief Engr. Thompson-Starrett Co., '99-'05. Consulting Engr. Private Practice, '05 to date.
68 Williams St., New York, N. Y.

1883.

†William H. Brenton. Div. Engr. C. & A. R. R., '84-5. Div. and Res. Engr. C. R. I. & P. R. R., '86-8. Asst. Engr. Col. Midland R. R., '89-'91. Res. and Loc. Engr. C. R. I. & P. R. R., '92. Asst. Chief Engr. do., '94. Roadmaster do., '95-6; Col. Midland R. R.
1430 Colorado Ave., Colorado Springs, Col.

Loomis E. Chapin. M. Am. Soc. C. E., do. Am. Water Works Assoc., do. Civil Engrs. Club of Cleveland, do. Ohio Engr. Soc. Asst. City Engr., Toledo, O., '83-7. Asst. Engr. with J. D. Cook, C. E., '87-'91. City Engr. Canton, O., '91-9. Consulting Engr. Water Wks., '91 to date. Firm Chapin & Knowles, Civil and Consulting Engrs., '02 to date. Offices at Canton, O., and Pittsburg, Pa. *15 Central Savings Bank Bldg., Canton. O.*

†**George H. Chipman.** Asst. Engr. V. S. & P. R. R. Bridge at Shreveport. Co. Surveyor. *Childress, Tex.*

Frank M. Dunlap, (Mechanical). M.E., '85. M. Am. Soc. Mech. E. Charter Mem. Mich. Engr. Soc. Cor. Secy. do., '82-3. D'ftsman Iron Bay Mfg. Co., '83-4. Supt. Works, Detroit Gas Light Co., '87-8. D'ftsman F. W. Wheeler Co., Bay City, '89-'90. U. S. Asst. Engr. St. Mary's Falls; Designer Hydr. Mach'y, New Lock, '90-6. D'ftsman U. S. Heater Co. at present.
260 W. Hancock Ave., Detroit, Mich.

John W. Payne. M. Ohio Engr. Soc. Pres. of same, '04. U. S. Surv. and Miss. Riv. Imp., '83-4. In business, '84-'92. Asst. City Engr., Akron, O., '92-8. City Civil Engr., Akron, '98 to date. *79 Beck Ave., Akron, O.*

Job Tuthill. M. Am. Soc. C. E., do. Am. Ry. Engr. and Maintenance of Way Ass'n, do. Detroit Engr. Soc. Transitman Pike's Peak R. R., '83-4. D'ftsman Bdges and Bldg. Dept. C. M. & St. P. R. R., '84. Assst. Engr. D. L. & N. R. R., '84-9. Do. D. L. & N. R R and C. & W. M. R. R., '89-'90. Engr. of Bridges and Bldgs. do., '90-'00. Brdge. Engr. Pere Marquette R. R., '00 to date. *149 Horton Ave., Detroit, Mich.*

Isaac O. Walker. Member and Past President Roadmasters' Assoc. of America; M. Engr. Assoc. of the South; do. Amer. Soc. for Testing Materials; do. Amer. Railway Engr. and Main. of Way Assoc. Topog. Miss. Riv. Survey, '83-5. Asst. Engr. D. L. & N. R. R., '86. Do. T. St. L. & K. C. R. R., '86-9. Asst. Engr. P. & M. Div. N. C. & St. L. R. R. to date.
1231 S. Sixth St., Paducah. Ky.

1884.

Henry D. Burnett. Supt. Incandescent Lamp Works, Gen'l Elect. Co., Lynn, Mass. Do. Canadian Gen'l Elect. Co.
Peterborough, Ont.

James L. Callard. Ph.B. (Hillsdale Coll.), '80. Ph.M. (Hillsdale Coll.), '83. Div. Engr. C. & N. W. R. R., '84-6. Res. Engr. P. & S. S. M. R. R., '86-7. U. S. Inspector, War Dept., '87-'91. U. S. Asst. Engr., War Dept., '91 to date.
Morgantown, W. Va.

William G. Clark. Jun. Am. Soc. C. E. M. Toledo Soc. of Engrs. Acting Prof. Civil Engr. Mo. School of Mines, Rolla, Mo., '86-7. Asst. City Civil Engr., Toledo, O., '87-'92. Mem. firm Wick-

enden & Clark, Toledo, O., '92-5. City Civ. Engr., Toledo, O., '95-7. Chf. Engr. Am. Sanitary Engr. Co., Detroit, Mich., '97-'00 Civ. and Consulting Engr., Toledo. O., '00 to date.
1043 Spitzer Bldg., Toledo, O.

Robert C. Gemmell. C.E., '94. M. Am. Soc. C. E., do. Am. Inst. M. E., do. Franklin Inst. Div. Engr. A. T. & S. F. R. R.; Bldg. and Water Service Engr. C. S. F. & C. R. R., '84-'90. Practicing Hydraulic Engr. in Oregon and Washington, '90-4. Practicing Hydraulic and Mining Engr. in Utah, '94-'01. Engr. De La Mar's Mines, '96-'01. State Engr. of Utah, '98-'01. Chf. Engr. Mexican Mining Syndicate, '01-'02. Supt. Minas Bananza y Arxes for Guggenheim Exploration Company, '03-'04.
Hacienda de Bonanza, Mexico, Zacatecas.

John C. Streng. M. Detroit Eng. Soc. Chief D'ftsman Industrial Wks., Bay City, '85-'93. D'ftsman Bucyrus Steam Shovel and Dredge Co., So. Milwaukee, '93-5. Chief D'ftsman and Asst. Engr. do., '95-'00. Acting Engr. Vulcan Iron Wks., Chicago, '00-'01. Senior D'ftsman Hoover & Mason, Chicago, '01-'04. Senior D'ftsman Great Lakes Eng. Wks., Detroit, Mich., '04 to date. *479 Sheridan Ave., Detroit, Mich.*

1885.

†**Emil Bauer.** *Saginaw, Mich.*

Edward D. Clary. Engr. United Gas Impt. Co., Phila., '86-9. Mgr. Gas Light Co., St. Albans, Vt., '87-9. Asst. Supt. G. L. Co., Paterson, N. J., '89. Mgr. Burlington G. L. Co., '89 to date.
Burlington, Ia.

Alexander E. Kastl. M. Am. Soc. C. E. U. S. Asst. Engr. Miss. Riv. Survey, '82-4. Do. Grand River Survey, '84. Asst. City Engr., Grand Rapids, Mich., '85. Asst. Engr. Drainage and Water Supply Com'n, Chicago, '86-7. Asst. Div. Engr. A. T. & S. F. R. R. in Ill., '87-8. Principal Asst. Engr. Brazos Riv. Channel and Dock Co., '88-'90. Chief Engr. do., '91. 1st Asst. Engr. Tampico Harbor Wks., Tampico, Mex., '90-1. U. S. Asst. Engr. Red River Survey, La., '91-2. Div. Engr. Sanitary Dist. of Chicago, '92-6. Engr. Asst. U. S. Deep Waterways Com'n, '96. Div. Engr. Metropolitan Water Wks., Massachusetts, '96-'02. Chief Engr. Denver Union Water Co., Denver, Col., '02-'04. Constructing Engr. Reclamation Service, U. S. Geol. Survey, '04-'05. Consulting Engr. Feb. 1, '05, to date.
973 Clarkson St., Denver, Col.

Charles H. Lane. LL.B. (Nat'l Univ.), '88. D'ftsman Mo. Valley Bdge. Wks., '86. Prin. Exam. Patent Office from '93 to date.
1339 Q St., Washington, D. C.

Egbert T. Loeffler. D.D.S., '88. Practiced dentistry in Saginaw, W. S., from '88 to '03. Since then have held Chair of Dental Therapeutics at Ann Arbor.
1106 Oakland Ave., Ann Arbor, Mich.

GEORGE F. SAMUEL. Asst. City Engr., Lake View, Ill., '85-6. Do. Topeka, Kan., '87. Asst. Engr. Dept. Pub. Wks., Chicago, '88-'95. Consulting Engr., Chicago, '96-8. Asst. Engr. Dept. Public Wks., Chicago, '98-'05.
Dept. Public Works, Chicago, Ill.

FRANK C. WAGNER, (Mechanical). A.M., '84. M. Am. Soc. M. E. F. Am. Assoc. for Adv. Science. Erecting Expert, Thomson-Houston Electric Co., '86-9. Asst. Prof. Mech. Engr., Univ. of Mich., '90-6. Assoc. Prof. of Steam and Elect. Engr., Rose Polytechnic Inst., '96-'03. Prof. of Steam Engr. and Assoc. in Elect. Engr., Rose Polytechnic Inst., '04 to date.
1111 S. Sixth Ave., Terre Haute, Ind.

1886.

RAYMOND W. BEACH. LL.B., '89. Asst. Engr. Chicago, Milwaukee & St. Paul Ry., '86-7. Do. Kansas City Belt Ry. Co., '87-8. Lecturer for Chicago Law School, '02-'05.
1501-4 Ashland Block, Chicago, Ill.

WILLIAM W. CAMPBELL. M.S. (Hon)., '99. ScD., '00. LL.D., '02. M. Astronomical Soc. of the Pacific; do. Astronomische Gesellschaft; do. Foreign Asson. Royal Astronomical Soc.; do. Italian Spectroscopic Soc.; do. Nat'l Acad. of Science. Prof. Math. Univ. of Colo., '86-8. Inst. in Astron. U. of M., '88-'91. Astronomer, Lick Observatory, '91 to date. Director of the Lick Observatory since January 1, '01.
Lick Observatory, Mt. Hamilton, Cal.

LEWIS E. DUNHAM, (Mining). Asst. Chemist, Joliet Steel Co., '86. Chemist, Furnace Co., Midland, Mo., '86-7. Private Practice, '87-9. Chemist, Ashland Iron and Steel Co., '89-'92. Asst. Mgr. Ashland I. and S. Co., '93-6. Mgr. do., '97-'04. Iron Ore Dept., M. A. Hanna & Co., Cleveland, '05.
24 Grassmere St., East Cleveland, O.

FRED G. FRINK. Assoc. M. Am. Soc. C. E. M. Am. Soc. for Promotion of Eng. Education. Do. Ills. Soc. for Engrs. Asst. Engr. Chicago & Alton Ry., '87. Do. Chi. & North-Western Ry., '88. Computer and D'ftsman, Vierling, McDowell & Co., '88-9. Supt. Construction, Snead & Co., '89-'90. Instr. Arch Drawing, Manual T'rg School, '90-7. Prin. Drawing Dept. Chicago Athenæum, '93-7. Prof. Civ. Eng., Univ. of Idaho, '97-'00. Instr. Civ. Eng., Univ. of Mich., '02-4. Asst. Prof. Civ. Eng., Univ. of Ill., '04 to date. *1003 Oregon Ave., Urbana, Ill.*

LESLIE W. GODDARD. Assoc. M. Am. Soc. C. E. M. of Western Soc. of Engrs. Rodman, Ann Arbor City Engr., '85. D'ftsman with F. C. Rossiter, Chicago, '86-7. Asst. Engr. Maintenance of Way, Louisville, New Albany & Chicago Ry., Aug., '87. Instrument-man, General Surveying, San Diego Co., Cal., '87-'89. Instrument-man with F. C. Rossiter, Chicago, '89-'90. U. S. Asst. Engr., U. S. Engineer's Office, Grand Rapids, Mich., '90 to date. *57 Park St., Grand Rapids, Mich.*

†HOWARD G. HETZLER. Div. Eng. C. B. & Q. R. R. Road Master C. B. & Q. R. R. *Chicago, Ill.*

LOUIS C. HILL, (Civil). (Electrical), '90. Engr. D. R. W. & So. R. R., '87-8. U. S. Asst. Engr., '88. Div. Engr. Gt. No. R. R., '89. Prof. Elect. Eng. Colo. School of Mines, '90-'03. Engr. U. S. Rec. Service, '03-'05. Supervising Engr., U. S. Rec. Service, '05. *Phoenix, Ariz.*

WILLIAM C. KING, (Civil). Construction I. C. R. R., '87-8. Div. Engr. C. B. & A. R. R., '89-'90. Asst. in City Engr's Office, Detroit, '96-'04. General C. E. Business, '04 to date. *222 Moffat Bldg., Detroit, Mich.*

BURT MCDONALD, (Mining). Architect N. Tex. Insane Asylum. Do. State Deaf and Dumb Inst. Do. Chem. Lab. and Hall, Tex. Univ. Do. Pub. Sch. Lamparac and Austin, Tex. Architect. *Austin, Tex.*

FRED MORLEY, (Civil). C.E., '90. M. Am. Soc. C. E. M. Soc. for the Promotion of Engineering Education. M. Mich. Engineering Soc. Asst. Engr. A. T. & S. F. R. R., '86-8. U. S. Asst. Engr Miss. River Imp., '88-9. Instr. C. E. U. of M., '89-'94 U. S. Asst. Engr. Grand Riv. Imp., '91. Do. Lake Survey, '93. Prof. C. E., Purdue Univ., '94-9. Resident Engr. St. Clair Flats Survey, Mich., '99-'02. U. S. Engr. Ill. Riv. Survey, '02 to date. *Lapeer, Mich.*

GEORGE R. SIMPSON, (Civil). LL.B. (Nat'l Univ. Law School, Washington, D. C.), '88. M. Am. Soc. Mech. E. Asst. Engr. Lake View, Ill., '85. Asst. Engr. Chicago Forge and Bolt Co., '86. Asst. Exam. Mech. Eng. Pat. Office, '86-9. First Asst. Exam. Metal Work Div., '89-'94. Principal Exam. Railway and Rolling Stock Div. Member of the Bar of the District of Columbia. Member of the Bar of the U. S. Supreme Court. *Room 304, U. S. Patent Office, Washington, D. C.*

†CLIFFORD C. SMITH, (Mechanical). D'ftsman Blake Pump Co., '86-7. Chf. D'ftsman for S. T. Wellman. Constn. Engr. Wellman Iron and Steel Co., Chester, Pa. Asst. Head D'ftsman Plate Mill Constn., Ill. Steel Co. Chf. D'ftsman Loco. Crane Dept. Brown Hoisting and Conveying Mch. Co. *Cleveland, O.*

†ERNEST STENGER, (Civil). Assoc. M. Am. Soc. C. E. D'ftsman A. S. F. & C. R. R. Do. Union Ry., Kansas City. Asst. Engr. Mo. Pac. R. R. Asst. City Engr. *Omaha, Neb.*

1887.

FRANK J. BAKER, (Mechanical). Secy. Hammond Light and Power Co. West. Agt. United Elect. Traction Co. Mgr. Madison Light and Power Co. Do. Chicago Illum. Co. V. Pres. North Shore Electric Co. *134 Washington St., Chicago, Ill.*

*Benjamin B. Bowen, (Civil). Engr. P. & V. Iron Wks., Omaha. D'ftsman Gillette-Herzog Mfg. Co. Died at Cleveland, O., April, 1900.

Seward Cramer, (Civil). LL.B., '91. Surveyor L. S. & M. S. R. R., '87-8. Do. Spring Valley Coal Co., '88-9. Reporter and Newspaper Correspondent since '92. *Ann Arbor, Mich.*

Charles Y. Dixon, (Civil). M. Am. Soc. of C. E.; do. Mich. Engr. Soc.; do. Detroit Engr. Soc. Transitman T. St. L. & K. C. R. R., '89. Do. Max Meadows, Va., Land and Imp. Co., '90-1. U. S. Asst. Engr. St. Mary's Falls Canal, '92-6. Do. Detroit Riv. Imp., '96 to date. *Amherstburg, Ont.*

Joseph Halsted, (Mechanical). Mnf. Architectural Iron Work. *388-390 W. Randolph St., Chicago, Ill.*

***William R. Hand**, (Civil). With Vierling, McDowell & Co. Dftsman, P. E. Lane, Chicago. West. Agt. Lane Bdge. and I. Wks., Denver. Prof. of Eng. Sch. of Mines, Colo. Died at Denver, October, 1895.

†**Kendal W. Hess**, (Mechanical). Dftsman Bay City Indust. Wks., '87-9. Genl. Mgr. McArdle & Sinclair Mfg. Co. *New Orleans, La.*

John D. Hibbard, (Mechanical). V. Pres. The John Davis Co., '89-'02. Pres. Do., '02 to date. Pres. Davis Construction Co., '97 to date. *22nd and Halsted Sts., Chicago, Ill.*

George B. Hodge, (Civil). M.Pd. '01. Supt. Schools, Le Sueur, Minn., '87-9. Prin. Normal Dept., Univ. of N. Dak., '90-2. Secy. Educational Dept. International Com. Y. M. C. A., '92 to date. *3 W. 29th St., New York, N. Y.*

John M. Jaycox, (Mining). Mech. and Min. Engr. *Germantown, Pa.*

George Loughnane, (Civil). M. Western Soc. of Engrs. Asst. Engr. E. J. & E. R. R. Do. Houston, Tex. Cen. & No. R. R. Do. C. & O. R. R. Do. W. & M. R. R. Asst. Engr. Chicago & N. W. Ry., '99-'03. Div. Engr. & Supt. B. & B., Chicago & N. W. Ry., '03-'05. Still Div. Engr. *Mason City, Iowa.*

John C. Moses, (Civil). B.S. (Urbana), '85. M. Am. Soc. of C. E.; do. Boston Soc. of C. E. Instr. in Math., Urbana Univ., '87-9. Asst. in Bdge Engr's office, Mich. Central R. R., '89-'90. Draftsman, Detroit Bdge & Iron Works, '91-2. Dftsman, Boston Bdge Wks., '93-5. Chf. Dftsman Do., '95-'03. Engr. of Construction, Do., '03 to date. *6 Irving Terrace, Cambridge, Mass*

*Fred B. Pelham, (Civil). Asst. Engr. M. C. R. R. Died at Detroit, February, 1895.

†George Roehm, (Civil). Bdge. Insp. M. C. R. R., '87-'90. Chief Dftsman Milwaukee Bdge & Iron Co., '90. Do. Wis. Bdge. Co., '92-3. Dftsman. Detroit Bdge. Wks., '91-2. Do. '93 to date. *301 25th St., Detroit, Mich.*

†**Benno Rohnert**, (Civil). Jun. Am. Soc. C. E. Asst. Engr. Chesapeake Dry Dock Co., Newport News, Va., '88. U. S. Asst. Engr. St. Mary's Falls Canal. Do. Hay Lake and 21 ft. Channel Imp., '97 to date. *Sault Ste. Marie, Mich.*

†**James A. Sinclair**, (Mechanical). Dftsman for M. Garland, Bay City. Salesman, E. P. Allis Co., Milwaukee. Prest. McArdle & Sinclair Mfg. Co. *New Orleans, La.*

†**Earl P. Wetmore**, (Mechanical). Coast Engr. Sprague Elec. Motor Co. Do. N. W. Gen. Elect. Co. Gen. Agt. and Const. Engr. Gen. Elec. Co. Inventor Elec. Water Heaters. Asst. Chief Engr. London United Tramways. *Chiswick, London W., Eng.*

1888.

Albert Burnstine, (Civil). Sub-Inspector, Public Works, St. Mary's Falls Canal, '88-9. Asst. Engr. Coal Dept., U. P. R. R., '89. Supt. & Engr., Contractors St. Mary's Falls Canal, '89-'90. Do. Electrical Zinc Co., New York, '90-4. Contracting Engr., Berlin Iron Bridge Co., '94-'00. Contracting Mngr. Amer. Bridge Co., and Milliken Brothers, New York, '00-'03. Engr. & Contractor, '03 to date. Spanish War, Lieut. (J. G.) U. S. N., U. S. S. Apache. *11 Broadway, New York, N. Y.*

Fred C. Davis, (Civil). B.S. (Mich. Agl.) '89. Civil Engr. *Lincoln, Placeo Co., Cal.*

Edwin H. Ehrman, (Mechanical). Dftsman, Morrison & Corthell, '88. Chief Dftsman, Chicago Screw Co., '88-'95. Sec'y & Supt. Walker & Ehrman Mfg. Co. (Mfrs. Milled Screws), '95 to date. *314 Washington Boulevard, Oak Park, Ill.*

John E. Hodge, (Civil). Dftsman, Spier & Rohns, Architects, '88. Dftsman, M. C. R. R., '88-9. Shipping Clk. & Foreman, W. G. Vinton Co., Detroit, '89-'90. Agt. N. E. Mut. Life Ins. Co., '90-1. Gen'l Agt. N. E. Mut. Life Ins. Co., '91-'01. Supt. of Exploration Work for E. J. Longyear, '02-3. Exploration & Contracting, Longyear & Hodge, '03-5. *Galena, Ill.*

James A. Lewis, (Civil). C.E., '03. M. Western Soc. of Engrs. Drftsman and Supt. Arch. Iron Wks., '89-'93. Engr. for C. E. Clark, '93-8. Chief Engr. for Henry Ives Cobb, Archt., '98 to date. General Supt. do., '02 to date. *377 Eighth St., Brooklyn, N. Y.*

†**Ross L'H. Mahon**, Ph.B., '86, (Mechanical). Dftsman Dry Dock Eng. Wks., Detroit. Supt. Marinette Iron Wks., Duluth. Investment Broker. Agt. Fidelity & Deposit Co. of Md. *Duluth, Minn.*

William H. Muir, (Mechanical). Vice-Pres't Eureka Iron and Steel Wks. Secy. and Treas. Jenks & Muir Mfg. Co. *Palms Apartment, Detroit, Mich.*

†**Walter R. Parker**, (Mechanical). M.D. (U. of Penn.), '91. Physician. Ensign U. S. N., '98. *Detroit, Mich.*

William H. Pease, (Civil). Instr. Math. Private School, Chicago, '88-9. Dftsman, Smith Bridge Co., and Toledo Bridge Co., '90-3. Drftsman, Detroit Bridge & Iron Wks., '93-'01. Dftsman, Detroit Plant Amer. Bridge Co., '02-3. Engr. Detroit Plant, Amer. Bridge Co., '03 to date. *11 Poplar St., Detroit, Mich.*

Willard Pope, (Civil). M. Amer. Soc. of C. E., do. Detroit Engr. Soc. Dftsman, Detroit Bridge & Iron Wks., '88-'92. Asst. Engr. Do., '92-7. Secy. & Treas. Do., '98-9. Pres't. Do., '00-'01. Vice-Pres't & Engr. Canadian Bridge Co., Ltd., Walkerville, Ont., '01 to date. *Walkerville, Ont.*

Percy H. Richardson, (Civil). C.E., '91. C. and Min. Engr. Norfolk Coal and Coke Co. U. S. Insp. Riv. and Harbor Imp., N. H. Prof. Hydraulic & Sanitary Engineering, Purdue Univ., '92-3. City Eng. of S. Portland, '03. Local practice since '93. *120 Exhange Street, Portland, Me.*

†Charles E. Roehl, (Mechanical). Asst. Dist. Engr. Edison Gen. Elec. Co., '92. Supt. W. & V. Tramway Co., B. C., '93. Supt. St. Jo. Ry. Light, Heat and Power Co. *St. Joseph, Mo.*

Joseph P. Rusche, (Civil). Insp. Morison & Corthel. Asst. to Div. Engr. C. & W. M. R. R. Dftsman, Do. Asst. Engr. G. R. & I. R. R., '99-'01. Engr. Records and M. W. and S. Accts. do. Contractor, '01 to date. *4 Portsmouth Terrace, Grand Rapids, Mich.*

*Edgar Ryan, (Civil). Dftsman, Anaconda Smelting Wks. Died at Grand Island, Neb., June, '92.

Ralph M. Shankland, (Mechanical). M. Western Soc. of Engrs.; do. Am. Soc. C. E. Dftsman, Wrought Iron Bridge Co., Canton O., '88-9. Inspector Penn. R. R., Pittsburg, '89-'90. Asst. Engr. D. H. Burnham & Co., '90-9. Member of firm, E. C. & R. M. Shankland, Civil Engrs., '99 to date. *1106 Rookery Bldg., Chicago, Ill.*

John W. Shotwell, (Civil).

Ernest M. Sprague, (Civil). Asst. Engr. C. & N. W. R. R., '88-'95. Dftsman, Detroit Bridge Wks., '95. Do. Am. Bridge Wks., Chicago, '95-7. Do. N. P. Ry. Co., St. Paul, '97. Engr. S. W. Bridge Wks., Ft. Worth, '97. Engr. & Agt. Gillette-Herzog Mfg. Co., Denver, '98-'00. Contracting Engr., Am. Bridge Co. of N. Y., Denver, '00 to date. *222 Equitable Building, Denver, Colo.*

Herbert J. Still, (Mining). Atty. at Law. *Rochester, N. Y.*

Ebenezer F. Walbridge, (Civil). M. Toledo Soc. of Engrs. Engr. Corps, L. S. & M. S. R. R., '89-'90. Do. Toledo, '90-1. Dftsman, Masillon Bdge. Co. Agt. Decorative Art Co., Cinn., '92-3. Secy. and Treas. Lloyd Lumber Co., '93-8. Do. Walbridge Lumber Co., '98-'03. Asst. Engr. Riggs & Sherman, Toledo, O., '03. Do. City of Toledo, '04 to date. *2013 Jefferson Ave., Toledo, O.*

†Henry E. Whitaker, (Civil). Jun. Am. Soc. Mech. E. Dftsman. Jesse M. Smith, '88-'94. Machine Designer, F. S. Hubel, '94 to date. *301 Forest Ave., W., Detroit, Mich.*

HARRY J. WILLIAMS, (Mechanical). M. Canadian Mining Institute. Mine Supt., '88-91. Assoc. Manager, '91-5. Beaver Asbestos Co., Thetford Mines. Montreal Asbestos Co. Danville Slate Co. Manager Asbestos & Asbestic Co., Ltd., '95-'00. Do. Beaver Asbestos Co., '00-'02. Do. Asbestos & Asbestic Co., Ltd., '02 to date. *Danville, P. Q., Canada.*

1889.

FLAVIUS M. CROCKER, (Civil). M. Engineers Club of Cincinnati. Dftsman C. & O. Railway, '89-'90. Engr. and Archt. Supt. Cinn., '90-1. Asst. Engr. Jenney & Mundie, Archts., Chicago, '92-3. Archt., Chicago, '93-4. Asst. Engr. The L. Schreiber & Sons Co., Iron Wks., '94-7. Chief Engr., do., '97 to date. *2157 Grand St., Cincinnati, O.*

HERBERT S. CROCKER, (Civil). M. Am. Soc. of C. E.; do., C. E. Soc. of St. Paul. Dftsman, B. & B. Dept., C. M. & S. P. R. R., '89-'91. Asst. to Engr. Bdges. N. P. R. R., '91-4. Asst. Engr., The L. Schreiber & Sons Co., '95. Bdge. Engr. T. H. & B. R. R., '95-6. Asst. Engr. Lassig Bdge. & Iron Wks., '96. Asst. Engr. Bd. Public Wks., Denver, Colo., '97-'01. Asst. Erecting Mangr., Western Div., Am. Bridge Co., '01 to date. *1247 Monadnock Block, Chicago, Ill.*

JULIUS W. HEGELER, (Civil). Chief Engr. Matthiesson & Hegeler Zinc Co. *LaSalle, Ill.*

WILLIAM J. HUSSEY, (Civil). M. Am. Mathematical Soc.; M. Am. Astronomical and Astrophysical Soc.; M. Astron. Soc. of the Pacific; M. Washington Acad. of Sci.; Honorary Member. Assoc. Royal Astronomical Soc. of London; Do. Mexican Astronomical Soc. Asst. Naut. Almanac, Navy Dept., '89. Instr. in Math. U. of M., '89-'91. Instr. in Astron., U. of M., '91-2. Asst. Prof. of Astron., Leland Stanford Jr. Univ., '92-3. Assoc. Prof. of Astron. Do., '93-4. Prof. of Astron. Do., '94-6. Astron. Lick Observatory, Univ. of Cal., '96-'05. Expert on Observatory sites, Carnegie Institution, '03. *Mount Hamilton, Cal.*

†RICHARD KHUEN, JR., (Civil). Assoc. M. Am. Soc. C. E. Engr. Const. Water Wks., Bismarck. Asst. Engr. C. M. & N. R. R. Do. Merchants' Bdge., St. Louis, '89-'90. Shop Insp. Athens, Pa., for Memphis Bdge., '90-1. Asst. Engr. N. Y. L. E. & W. R. R., '91-2. Do. Elevated R. R.'s in Phila. Asst. Engr. Bridge Dep't. Pencoyd Iron Wks., '92 to date. *Philadelphia, Pa.*

WILLIAM A. LIVINGSTONE, (Mechanical). M. Detroit Engr. Soc.; M. Assoc. Am. Soc. Naval Archt. Marine Engr. and Agent. Manufacturer, '97 to date. *Detroit, Mich.*

FREDERICK H. LOVERIDGE, (Mechanical). Elec. Engr., Standard Elec. Co., '90-3. Do. Western Elec. Co., '94 to date. *Western Electric Co., Chicago, Ill.*

EUGENE MCALLASTER, (Mechanical). M. Pacific. Northwest Soc. of Engrs.; do., Soc. of Naval Archts. & Marine Engrs.; Assoc. Mem. Am. Soc. of Naval Engrs. Asst. Engr. Detroit Dry Dock Co., '89-'94. Consulting Engr. & Naval Archt., '94 to date.
503-504 Pioneer Bldg., Seattle, Wash.

†WILLIAM V. MOSES, (Mechanical). Dftsman S. T. Wellman, Cleveland, '89. Do. Iron and Steel Co., Thurlow, Pa., '90-3. Instr. Drawing and Mach. Design, Harvard Univ., '93 to date.
31 Mellen St., Cambridge, Mass.

ERNEST B. PERRY, (Mechanical). M.E. '96. Dftsman and Erecting Engr., Industrial Wks., '89-'93. Supt. & Engr., do., '93 to date.
1515 Fifth St., Bay City, Mich.

*WILLIAM P. ROUNDS, (Civil). Chief Engr. Cia McHardy, Machinery Mfrs. Campinas, Brazil. Died at Austin, Ill., November, 1897.

†HOMER M. SACKETT, (Mining). *Aspen (?), Colo.*

LOUIS H. SHOEMAKER, (Civil). C.E., '97. M. Am. Soc. C. E. Dftsman, J. D. Cook, Toledo. Transitman, T. St. L. & K. C. R. R., '89. Surveyor & Dftsman, R. R. Bourland, Peoria, Ill. Asst. Engr. Findlay, O., '90. Asst. Engr., F. Ft. W., & W. R. R., '91-2. Dftsman & Asst. Eng., Passaic Rolling Mill Co., Paterson, N. J., '93-'01. Estimating Engr., Am. Bridge Co., Pittsburg, Pa., '01-2. Engr. in charge Estimating Office, do., '02-4. Engr. in charge Bridge design, do. '04 to date.
Am. Bridge Co., Frick Bldg., Pittsburg, Pa.

FRANK C. SMITH, (Mining). E.M., '90. M. Institution of Mining & Metallurgy, London, Eng.; M. Am. Inst. of Mining Engrs.; Fellow of Geological Soc. of Am. Min. and Met. Engr. of various Mines, '92-6. Prof. Geol., Mining and Met., State Sch. Mines, S. Dak., '96-8. Gen. Supt. Golden Reward Geol., M. & M. Co., Deadwood. Vice-Pres. and Gen. Mgr. Sunset Min. and Reduction Co. Gen. Mgr. Gordon-Tiger Min. and Reduction Co., Leadville, Colo., '00-'03. Gen. Mgr. The Socorro Gold Co., Harrisburg, Ariz., '04 to date. *Harrisburg, Yuma Co., Ariz.*

†GORDON E. STANNARD, (Mechanical). Dftsman and Salesman, M. Garland, Bay City. Do. Filer & Stowell Co., Milwaukee.

†OTHO S. STULL, (Mining). Atty. at Law. *West Rush, N. Y.*

MINER C. TAFT, (Civil). A.B. (Kalamazoo), '85. A.M. Kalamazoo), '89. Senior Mem. Mich. Engr. Soc. Asst. City Engr. Kalamazoo, '86-'90 and '91-2. Asst. Engr., Sewer Construction and Plans, Dayton and Findlay, O., '90. Engr. in charge Sewer Construction, Sterling, Ill., '90. Leveler, Hennepin Canal, '90-1. City Engr., Kalamazoo, '92-8 and '03-5. Chief Engr. C. K. & S. R. R., '00-'02. Constructing Engr., Commissioners of Pub. Imp., Kalamazoo, '02-3. *309 Douglas Ave., Kalamazoo, Mich.*

PHILIP R. WHITMAN, (Mining). Head Chemist, Promontorie Mining Co., Bacarac, Mex., '90-1. Supt. Open Hearth, Crescent Steel Wks., Pittsburg, Pa., '91-6. Mill Work, Detroit Copper Co., Morenci, A. T., '00-01. Mill Work, Arizona Copper Co., Morenci, A. T., '02. Asst. Supt. Sonora Development Co., Nacozari, Mex., '04. Asst. Assayer, Ca. Metallurgic de Torrens, Torrens Coah, Mex., '05. Assayer, San Luis Min. Co., San Lucas, Durango, Mex., '05-'06.

San Lucas, via Canatlau, Durango, Mex., c/o San Luis Min. Co.

Gardner S. Williams, (Civil). C.E. '99. M. Am. Soc. of C. E.; M. N. E. Water Works Assoc.; M. Bd. of Managers, Assoc. of Eng. Socs.; M. Detroit Engr. Soc.; M. Mich. Engr. Soc.; M. Soc. of Sigma Psi; M. Engr. Soc. of Univ. of Mich. Asst. Engr., Constr. of Bismarck, Dak., Water Works, '87. Resident Engr., Constr. Water Works, Greenville, Mich., '88. Constructing Engr. Constr. Water Works, Owosso, Mich., '89. Dftsman & Supt. of Erection, Russel Wheel & Foundry Co., Detroit, '90-3. Civ. Engr. to Bd. of Water Comm'n, Detroit, '93-8. Engr. in charge of Hydraulic Laboratory and Prof. of Experimental Hydraulics, Cornell Univ., '98-'04. Prof. of Civil, Hydraulic and Sanitary Eng., U. of M., '04 to date. Mem. Internat'l Comm'n on Lake Navigation, '03 to date.

1503 Washtenaw Ave., Ann Arbor, Mich.

1890.

Frank Anderson, (Civil). Civil and Mining Engr. *Salt Lake City*

Frank S. Baillie, (Civil). M. Am. Inst. Mining Engrs. Surveyor, Gen. W. W. Duffield, '90-1. Dftsman, Am. Bridge Wks., '91-3. Asst. Engr. Gillette Herzog Mfg. Co., '93-6. Vice-Pres. and Gen. Mangr., Columbia Gold Mining Co., '96 to date.

Columbia Mine, Sumpter, Oregon.

William D. Ball, (Electrical). E.E., '95. M. Am. Inst. E. E.; M. Western Soc. Engr. Cons. Engr. Sperry Elec. Min. Mach. Co. and T. H. Elec. Co., '91-2. Supt. L. K. Comstock Co., '92-4. Designer of Elec. Light Plants, '94-5. Engr., Nagle & Ball. Engr. of Construction, U. S. Com. to Paris Exp., '00. Consulting Engr., '00 to '05. *1325 1st Nat'l Bank Bldg., Chicago, Ill.*

Andrew R. Benson, (Civil). M. Western Soc. of C. E. Asst. Engr., Clinton & Ill. Bridge Co., '90-2. Engr. Corps, Sanitary Dist. of Chicago, '92-4. Asst. Examiner, U. S. Patent Office, '94 to date. *Patent Office, Washington, D. C.*

Ernest B. Conrad, (Mechanical). M. Am. Soc. of M. E.; M. N. Y. Elec. Soc. Campbell Print. Press & Mfg. Co., '90. Chf. Dftsman, Davidson Pump Co., '91. Catalogue Work Gen. Elec. Co., Lynn, '92-3. Chf. Dftsman, P. Pryibil Co., '94-5. Estim. Engr. Sprague Elec. Co., '96-9. Supt. and Engr. Electric Launch Co., '99 to date. *127 Humphreys Ave., Bayonne, N. J.*

Henry W. Douglas, (Mechanical). M. Am. Gas Light Assoc.; M. Western Gas. Assoc.; M. Mich. Gas Assoc.; M. Ohio Gas Light Assoc. Gen. Mangr. and Treas. Ann Arbor Gas Co., '90 to date. Do. Mt. Clemens Gas Co., '99 to date. Do. Ypsilanti Gas Co., '02 to date. *211 East Huron St., Ann Arbor, Mich.*

Charles A. Fisher, (Civil). Dftsman with Fisher & Lawrie, Archts., Omaha, Nebr. Do. Joseph E. Mills, Detroit, Mich. Do. Malcomson & Higginbotham, Detroit, Mich. Do. Paxton & Vierling Foundry, Omaha. Member of firm, Fisher Bros., Archts. and Engrs. *Blandette Block, Pontiac, Mich.*

Joseph K. Freitag, (Civil). C. E., '94. Assoc. Mem. Am. Soc. of C. E. Dftsman, Morison & Corthell, '85-8. Do. Burnham & Root, Archts., '90. Asst. Engr. World's Columbian Exposition, '90-1. Asst. to Gen. Supt. of Grounds & Building, do., '91-3. Asst. Engr. Metropolitan Elevated Ry., '93-5. Chief Dftsman & Engr., Brown-Ketcham Iron Wks., '95-6. N. E. Agt., do., '96-7. Engr. of N. E. Office, Pencoyd Iron Wks., '97-8. N. E. Representative, Hecla Iron Wks., '99 to date. Author of "Architectural Engineering," published by Jno. Wiley & Sons, in '95. Revised and enlarged edition, 1901. Also of "The Fireproofing of Steel Buildings," published in 1899. *166 Devonshire St., Boston, Mass.*

***Winthrop E. Gastman**, (Electrical). Died Pueblo, Col., June, 1893.

†**Willis B. Hayes**, (Civil). Thomas & Hayes, Cont. and Con. Engrs. *Chicago, Ill.*

†**Johe R. Kempf**, (Mechanical). Dftsman Detroit Elec. Wks., '90-1. Insp. Carnegie Steel Co., '91-3. Foreman Insp. Dept. Nat. Cash Reg. Co., '94 to date. *Dayton, O.*

Rollo G. Manning, (Mining). C.E., '04. Assoc. M. Am. Soc. of C. E. M. Toledo Soc. of Engrs. D'ftsman Am. Bridge Wks., Chicago, '90-2. Do. Edge Moor Bridge Co., Edge Moor, Del., '92-3. Chief Dftsman Toledo Bdge. Co., '93-'01. Engr. Toledo Plant Am. Bridge Co. (Successor to Toledo Bridge Co.), '01 to date. *Toledo, O.*

Edmund S. C. May, (Civil). M. The Telephone Soc. of New York. Asst. in Engr. Dept. Am. Telephone and Telegraph Co., '90-2. Mech. Engr. Chicago Telephone Co., '92-3. Dist. Insp. Am. Telephone and Telegraph Co., '93 to date.
80 North Seventh St., Newark, N. J.

Elmer H. Neff, (Mechanical). M.E., '01. M. Am. Soc. M. E. Const. Engr. E. P. Allis Co. Chf. D'ftsman Gisholt Machine Co. Do. Tool Dept. Westinghouse Mach. Co. Do. West. Gas Const. Co. Instr. Mech. Eng. Purdue Univ. Designer Brown & Sharpe Mfg. Co. N. Y. Represent. Brown & Sharpe Mfg. Co.
136 Liberty St., New York, N. Y.

James B. Nelson, (Civil). Survey S. E. Kentucky, '90-1. Engr. Bdge. and Struct. Iron Wks., Chicago, '90-4. Civ. and Cons. Engr., '94-'00. Co. Surveyor Marion Co., '00-'01. City Engr. Indianapolis, '01-3. Mangr. Merchants' Heat and Light Co., '03 to date. *2315 Broadway, Indianapolis, Ind.*

LOUIS C. SABIN, (Civil). C.E., '94. M. Am. Soc. C. E. M. Am. Soc. for Testing Materials. M. Univ. of Mich. Engr. Soc. M. Detroit Engr. Soc. Insp. Bismarck Water Wks., Morison & Corthell, Engrs., '87. Asst. Engr. C. & A. Bridge, Chicago, Morison & Corthell, Engrs., '88. Do. Merchants Bdge., St. Louis, E. L. Corthell, Engr., '89. Insp. Engr. Dept. U. S. Army, '90-3. Asst. Engr. Engr. Dept. U. S. Army, '93 to date.
U. S. Engineer Office, Sault Ste. Marie, Mich.

GEORGE B. SPRINGER, (Civil). M. Western Soc. of Engrs. of Chicago, Ill. Instrument Man, Sanitary Dist. of Chicago, '90-1. Asst. Engr. W. Chicago Park Com., '92-3. Bdge. Insp. I. C. R. R., '94-6. Civil Engr. Chicago. Edison Co., '97 to date.
139 Adams St., Chicago, Ill.

IRVING M. WOLVERTON, (Civil). M. Am. Soc. C. E. M. Civil Engrs. Club of Cleveland. M. Engrs. Club of Columbus. D'ftsman The King Bridge, '90-4. Chief Engr. The New Columbus Bridge Co., '94-9. Do. The Mt. Vernon Bridge Co., '99 to date. *108 E. Gambier St., Mt. Vernon, O.*

1891.

GEORGE R. BRANDON, (Mechanical). M. Am. Soc. Mech. E. M. Western Soc. of Engrs. D'ftsman Whiting Foundry Equipment Co., Harvey, Ill., '91-2. Chief D'ftsman Do. '93-6. Engr. Do., '96-'05. *5203 Washington Ave., Chicago, Ill.*

ALFRED S. CALKINS, (Civil). Engr. Corps E. J. & E. R. R., '91-2. Asst. City Engr. Supt. of Streets, City of Joliet, 99-'01. Asst. Engr., City of Joliet, '01-'05. *Joliet, Ill.*

DWIGHT B. CHEEVER, (Mechanical). LL.B., '96. Mech. Engr. C. & W. M. and D. L. & N. Rys., '91-2. Asst. in Elec. Eng. Ansona Elec. Co., Chicago, '93. Mgr. and Elec. Engr. Wirt Elec. Eng. Co., Chicago and Phila. Atty at Law. Head of the firm with all honors and responsibilities, Cheever & Cox.
1133 Monadnock B'dg., Chicago, Ill.

JAMES M. CROSBY, (Electrical). Engr. Valley City Mill. Co., '91-3. Supt. Model Mills, '92-3. J. S. Crosby & Co., Ins. and Real Estate. *212 Fountain St., Grand Rapids, Mich.*

CLARENCE E. DEPUY, (Mechanical). M. Am. Soc. Mech. E. Inst. in Machine Shop, Chicago Manual Training Sch., '91-6. Asst. Prof. Mech. Construction, Lewis Inst., '96-9. Asst. Prof. Mech. Eng., do., '99-'04. Prof. Mech. Eng., do., '04 to date.
58 Warren Ave., Chicago, Ill.

BERNARD L. GREEN, (Civil). M. Am. Soc. of C. E. M. Civil Engrs. Club of Cleveland. Asst. Engr. Merchants' Bridge, St. Louis, '89. Do. Terminal Ry., St. Louis, '90. Eng. Sec'y E. L. Corthell, '91-2. Asst. Chief Engr. Tehuantepec Nat'l R. R., Mexico, '93. Asst. Engr. F. C. Osborn, '94-8. Associated with F. C. Osborn, '98-'00. Sec'y The Osborn Engineering Co., '00 to date.
310 Genesee Ave., Cleveland, O.

Harry J. Hatch, (Civil). Computer, Patton & Frank, Duluth, '91. Cashier Farmers' Nat'l Bank, Arkansas City, Kan., '91-7. 2nd Lieutenant 2nd Regt. Artillery, U. S. Army, '98; transferred to 4th Artillery in '98. 1st Lieutenant, Artillery Corps, U. S. Army, '01. Captain Artillery Corps, U. S. Army, '03 to date. After one year address, Captain H. J. Hatch, Art. Corps, C/o Military Sec'y, Washington, D. C. *Fort Barrmens, Fla.*

*William J. Hinkson, (Civil). B.S. (Mich. Agl.). Died at Detriot October, 1891.

†John T. N. Hoyt, (Civil). Assoc. M. Am. C. E. D'ftsman Penncoyd Bdge. Co. Do. Brooklyn Elev. R. R. Do. L. L. Buck, N. Y. Do. R. P. & J. H. Staats. Do. Metropolitan Traction Co. *349 Madison Ave., New York, N. Y.*

William T. Keating, (Civil). M. Western Soc. of Engrs. Leveller C. & N. W. R. R., '91-2. Asst. Engr. Sanitary Dist., Chicago, '92-'01. Supt. of Const. Larimer and Gallagher Cos., '01 to date. *577 S. Albany Ave., Chicago, Ill.*

Robert P. Lamont, (Civil). Eng. Dept. World's Fair, Chicago, '91-2. Sec'y and Engr. Shailer & Schniglau Co., Contractors, '92-7. Vice-Pres. Simplex Ry. Appliance Co., '97-'05.

†Edward J. Murphy, (Civil). Asst. Engr. Sanitary Dist. *Chicago, Ill.*

†Frederick S. Richmond, (Electrical). Elec. Engr. E. G. Barrett, Chicago. Do. L. L. Comstock Co. *Marquette Bldg., Chicago, Ill.*

†George H. Rowe, (Electrical). Asst. in Phys. U. of M., '91-2. Instr. Elec. Eng. U. of M. Prof. Phys. Univ. of Colo., '93-5. Prof. Elec. Eng., '95 to date. *Boulder, Colo.*

Robert L. Sackett, (Civil). C.E., '96. M. Am. Assoc. for the Adv. Science. Pres. of Indiana Eng. Soc. in '04-5. Recorder River and Harbor Survey, '91. Asst. Prof. Math., Earlham College, '91-8. Prof. Applied Math., Earlham College, '98-'04. Prof. Civil Eng. do., '04 to date. Consulting Engr. for Indiana State Hospital Bd., '03-'05. *Earlham College, Richmond, Ind.*

David W. Spence, C.E. B.S. (U. of Tex.), '89. D'ftsman Lane Bridge and Iron Wks., Denver, '90-1. Do. So. Halsted Str. Iron Wks., Chicago, '91-2. Asst. Prof. Civil Eng. and Physics, Agl. and Mech. College, Texas, '92-8. Assoc. Prof. C. E., do., '98-'02. Prof. Physics, do., '99-'04. Assoc. Prof. C. E., do., '02 to date. Asst. Engr. B & B. Ry., Bryan, Tex., Vacation '94. Asst. Engr. and Engr. Brazos River Channel and Dock Co., Valasco, Tex., Vacation '95 and '96. Asst. Engr. H. E. & W. T. Ry., Houston, Tex., Vacation '00. D'ftsman Union Bridge Co., Athens, Pa., Vacation, '99. D'ftsman Columbia Bridge Co., Pittsburg, Pa., Vacation '01. *College Station, Tex.*

Gabriel C. Tuthill, (Civil). M. Detroit Engr. Soc. Asst. Bridge Engr. M. C. R. R., '91-'05. *107 Horton Ave., Detroit, Mich.*

GEORGE M. WALKER, JR., (Civil). M. Am. Railway Engr. and Maintenance of Way Assn. Div. Engr. Gulf Colorado & Santa Fe Ry., '90-1. Res. Engr. Jacksonville Southeastern Line, '91-4. City Engr., Argentine, Kan., '94-7. Asst. Engr. and Roadmaster Kansas City Belt Ry., '96 to date.
3508 Windsor Ave., Kansas City, Mo.

THOMAS L. WILKINSON, (Mechanical). Jun. Am. Soc. Mech. Engrs. Do. Colo. Scientific Soc. D'ftsman M. C. Bullock Mfg. Co., Chicago, '91-2. Insp. Machinery, Joliet Plant, Ill. Steel Co., '92-3. Consulting Engr. Freeman-Smith Lumber Co., '94 to date. Do. Silver Lake Mines, Colo., '98-'00. Do. Bachelor Gold M. Co., Colo., '02 to date. Consulting Mech. Engr., General Practice, '94 to date.

1892.

JOHN R. ALLEN, (Mechanical). M.E., '96. M. Am. Soc. Mech. E. M. Am. Asso'n Adv. of Science. M. Detroit Eng. Soc. Erector and D'ftsman Bay City Ind. Wks., '92-3. Engr. and Sec'y L. K. Comstock Co., '93-5. Mem. of firm Ball & Allen, '95-6. Instr. Mech. Engr. U. of M., '96-9. Asst. Prof. do., '99-'02. Jun. Prof. do., '02 to date. *226 S. Ingalls St., Ann Arbor, Mich.*

ELMER L. ALLOR, (Civil). LL.B., '95. M. U. of M. Eng. Soc., M. Detroit Bar Ass'n. M. Mich. State Bar Ass'n. Inst. Astronomy, U. of M., '92-3. Recorder U. S. Lake Survey, '91-4. Atty. at Law, '95 to date. *709 Union Trust Bldg., Detroit, Mich.*

THOMAS E. BARNUM, (Electrical). D'ftsman Gen. Elec. Co. Do. Chicago Edison Co. Do. West. Elec. Co. Do. Crane Elevator Co. Chief D'ftsman Cutler-Hammer Mfg. Co., '98-'01. Chief Engr. do., '01 to date. *648 34th St., Milwaukee, Wis.*

WILLIAM BASSETT, (Mechanical). M. Western Ry. Club. With Shaw Elect. Crane Co., '92. D'ftsman Industrial Wks., Bay City, '92-5. Chief D'ftsman do., '95-9. Mathematician Brooks Loco. Wks., Dunkirk, N. Y., '99-'02. Chief D'ftsman Industrial Wks., Bay City, '02 to date. *401 Birney St., Bay City, Mich.*

†IRVING D. CARPENTER, (Civil). D'ftsman Detroit Bridge Wks. Do. Am. Bridge Wks. Do. Elmira Bridge Co. Do. Keystone Bridge Wks. Dental Student, U. of M., '98-9. *Ann Arbor, Mich.*

EDWIN H. CHENEY, (Electrical). Engr. with Chicago Edison Co., '92-8. Mngr. Mutual Elec. Co., '98-'00. Vice-Pres. and Mngr. Ill. Maintenance Co., '00 to date. Pres. Station Equipment Co., '01 to date.
1625 Marquette Bldg., 204 Dearborn St., Chicago, Ill.

ELEAZAR DARROW, (Electrical). M. Am. Inst. of Elec. Engrs. Elect. Supt. Cinn., Newport & Cov. Ry. Co., Cinn. & Dayton St. Ry. Co., and Cinn. & Rosedale Ry., '92-4. Gen. Supt. Cinn., Edison and Queen City Elec. Co., '94-6. Director Dept. of Mech. and Elect. Eng., Washington State College, '96-'00. Chief Engr. Cinn., Newport & Cov. Rys., and Union Light, Heat and Power Co.,

'00-'03. Consulting Engr. Cinn. & Columbus Traction Co., Cinn. & Northwestern Ry., and Cinn. & Erlanger Ry., '03 to date.
1010 Commercial Tribune Bldg., Cincinnati, O.

ARTHUR FRANTZEN, (Mechanical). Assoc. M. Am. Inst. E. E. D'ftsman Fraser & Chalmers, '92-3. Insp. Arc Lamps Columbian Exp., '93-4. Elec. Engr. and Contractor, '94 to date. Sec'y and Treas. Arthur Frantzen Co.
225 Dearborn St., Chicago, Ill.

JAMES N. HATCH, (Civil). M. Am. Soc. of C. E. M. Western Soc. of Engrs. M. Associated Eng. Societies. Mech. D'ftsman Phila., '92-3. Instr. Math. and C. E. Mich. Agl. Coll., '93-4. Asst. Engr. M. of W., C. C. C. & St. L. R. R., '94-5. Struct. D'ftsman Carnegie Steel Co., '95-7. Do. Pittsburg Bridge Co., '97-9. Asst. Engr. Brown Hoisting Mach. Co., '99-'00. Supt. of Const. U. S. Public Building, '00-'02. Chief D'ftsman Ericson & Lehmann, Chicago, '02-3. Chief Struct. Engr. Sargent & Lundy, Chicago, '03 to date.
1720 Railway Exchange, Chicago, Ill.

†CHARLES A. HOWELL, (Mining). Asst. Mgr. W'n. Canal Const. Co. Transitman U. S. Eng. Corps. Mgr. Metallic Goods Mfg. Co. Atty. at Law. *Detroit, Mich.*

*WILLIAM M. JOHNSTONE, (Mechanical). Asst. Engr. Globe Iron Wks., Chicago. Eng. Dept. Col. Fuel and Iron Co. Died at Hamilton, Ill., September, 1898.

†JOHN P. KEYES, Ph.B., (Mechanical). Mech. Engr.
St. Paul, Minn.

WILLIAM B. LARRABEE, (Electrical). Asst. Engr. U. S. Top. Survey, Elect. Gray Nat'l Telautograph Co., '92 to date.
New York, N. Y.

ALFRED C. LEWERENZ, A.B., '91, (Civil). Assoc. Mem. Am. Soc. C. E. D'ftsman Detroit Bridge Wks., '92. Chief D'ftsman C. & W. M. and D. L. & N. R. R., '92-3. Asst. Engr. B. R. & P. R. R., '94-88. U. S. Bureau Yards and Docks, Wash., '94-9. Civ. Engr. U. S. N., '99. In Charge Naval Station, New London, Conn., with special duty at other navy yards on Atlantic and Gulf of Mexico, '99-'03. In charge Eng. Work, Navy Yard, Puget Sound, Wash., '03 to date.
Navy Yard, Puget Sound, Wash.

ARTHUR D. MOTT, (Civil). M. Western Soc. of Engrs. D'ftsman Purdy & Henderson, '92-8. Member of firm Rosencranse & Mott, '98-9. Member of firm Ritter & Mott, '99-'05.
242 S. 18th Ave., Maywood, Ill

†ADNAH C. NEWELL, (Electrical). In Charge Man. Train. Dept. Pueblo H. S., '92-4. Prof. Mech. Drawing and Man. Train. Des Moines H. S., '94 to date. *Des Moines, Ia.*

WALTER W. SEYMOUR, (Civil). M. Western Soc. of Engrs. Asst. on City Engr. Corps, Grand Rapids. Do. Duffield & Son, Pine-

ville, Ky. D'ftsman Chicago Bridge Wks. Do. Am. Bridge Wks., '93-'01. Engr. Am. Bridge Co., '01-4. Engr. Kenwood Bridge Co., '04 to date.
C/o Kenwood Bridge Co., Grand Crossing, Ill.

†Albert H. Smith, (Civil). D'ftsman Toledo Bridge Co., '92-9.
1309 Utah St., Toledo, O.

†Edwin M. Smith, (Civil). Asst. Engr. M. C. R. R., '92-3. Asst. Engr. Sewer Dept., Chicago Drainage Canal, '93-4. Asst. Engr. St. Dept., Chicago, '94-7. Cleveland Mngr. Am. Luxfer Prism Co., '97-8. Gen. Mngr. Electric Co., '99.
Marine Bldg., Cleveland, O.

Hugh F. Van Deventer, (Mining). Pres. Georgia Slate Co., '95-'05. Sec'y So. States Portland Cement Co., '02-'05. Treas. do., '05 to date. *Empire Bldg., Atlanta, Ga.*

George M. Wisner, (Civil). M. Am. Soc. C. E. M. Western Soc. of Engrs. M. Engineers' Club, Chicago. Sub. Asst. Engr. San. Dist., Chicago, '92-7. Asst. to Chief Engr. do., '97 to date.
1010 Security Bldg., Chicago, Ill.

1893.

Charles G. Atkins, (Electrical). Assoc. M. A. I. E. E. First Asst. Engr. Tests, Westinghouse E. & M. Co., '93-5. Const. Engr. do., '95-6. Supt. Shops Chicago Edison Co., '96-'00. Power Engr. do., '00-'01. Consulting Engr. Pratt & Atkins, '01-4. Consulting Engr., Successor to Pratt & Aitken, '04 to date. *1001 Monadnock Bldg., Chicago, Ill.*

Hadley Baldwin, (Civil). M. Engr. Soc.. U. of M. M. Am. Railway Eng'g and Maintenance of Way Assoc. Asst. Engr. Maint. of Way C. C. C. & St. L. R. R., '93-6. Supervisor Track do., '96-8. Engr. Maint. of Way do., '98-'02. Div. Supt. do., '02 to date. *1318 Wabash, Matoon, Ill.*

†John Y. Blackwood, (Mechanical). D'ftsman F. N. Dunlap. Do. Rogers Typo. Co. Do. Mergenthaler Linotype.
Brooklyn, N. Y.

Will H. Boughton, (Civil). C.E., '98. M. Ohio Engr. Soc. Instr. and Asst. Prof. of C. E., Denison Univ., '94-'03. Prof. of C. E., West Virginia Univ., '03 to date. Grad. Student, Univ. of Chicago, Summer Quarters, '98-9. Asst. Engr. C. C. C. & St. L. Ry., Summer '94. D'ftsman Am. Bridge Co. (Several Plants) and Brown Hoist. Mach. Co., Summers '95-7 and '00-4.
Morgantown, W. Va.

Harry O. Channon, (Electrical). Sec'y and Mgr. Empire Light and Power Co., '95-8. Erecting Engr. Quincy Gas and Electric Co., '98-'00. Supt. do., '00-'02. Supt. Alton Light and Traction Co., Alton, Ill., '02-4. Supt. Quincy Gas and Electric Co., '04 to date. *1425 Vermont St., Quincy, Ill.*

Albert L. Clark, (Mechanical). M. Mich. Eng. Soc. Mech. Engr. Wm. E. Hill Co., Kalamazoo, '94-5. D'ftsman Bay City Ind. Wks. With Mo. River Com. Supt. Bldg. Const., '95-7. D'ftsman Detroit Dry Dock Co., '97-8. Supervisor of Manual Training and Asst. Prin. Calumet High School, '98-'02. Supervisor of Manual Training, Oak Park and River Forest Township High School, '02-5. *841 Forest Ave., Oak Park, Ill.*

William J. Currer, (Civil). Salesman Bishop & Co., of California, '95-'00. Mngr. New York office, do., '00 to date. *15 Jay St., New York, N..Y.*

Jasper C. Davis, (Civil). Asst. City Engr., Lansing, '93-5. City Engr., '95-9. Asst. Engr. Northwestern Elevated R. R., Chicago, '99-'00. Do. Wisconsin Central R. R., Ironwood, Mich., '00. Do. Union Pacific R. R., Denver, Colo., '00-'04. Do. E. J. & E. R. R., Joliet, Ill., '04. D'ftsman and Engr. Cananea Consolidated Copper Co., '04 to date. *C/o Narrow Gauge R. R., Cananea, Sonora, Mexico.*

William H. Dorrance, Jr., (Mechanical). Asst. to Prof. M. E. Cooley, '93-5. D'ftsman Stirling Co., Barberton, O., '95-9. Do. Webster, Camp & Lane Co., Akron, O., '00-'02. Estimator do., '03. D'ftsman Olds Motor Works, Detroit, '04-5. *704 Meldrum Ave., Detroit, Mich.*

John D. E. Duncan, (Electrical). Assoc. M. Am. Inst. E. E. M. A. S. M. E. M. Brooklyn Eng. Club. Asst. Engr. Stanley Elec. Mfg. Co., '95-6. Electrician Terre Haute St. Ry. Co., '96. Do. Western Elec. Co., Met. St. Ry. Co., N. Y. Tel. Co., '97. D'ftsman and Const. Engr. Westinghouse, Church, Kerr & Co., '98-'00. Electrician and Engr. Cons. Ry. St. & Eq. Co., '00. Engr. Sanderson & Porter, '01-'05. *52 William St., New York City, N. Y.*

Grant H. Dunning, (Civil). Co. Surveyor, '93-5. Teaching, '95-7. Asst. U. of M., '97-8. Instr. Math., Dowagiac H. S., '98-'01. Principal Dowagiac H. S., '01 to date. *101 Center St., Dowagiac, Mich.*

Henry G. Field, (Electrical). M. Am. Inst. of E. E. M. Detroit Eng. Soc. Engr. Elect. Subway, Columbian Exposition. Elec. Inspector Mich. Insp. Bureau. Agt. Electric Service Co. Field & Hinchman, Cons. Elect. and Mech. Engrs., '94-'03. President Field, Hinchman & Smith, Engrs. and Archts., '03 to date. *710 Washington Arcade, Detroit, Mich.*

William J. Fisher, (Electrical). M. Mich. Eng. Soc. Engr. P. & S. L. Elec. R. R. City Engr. Pontiac. Chf. Const. Engr. F. & C. R. R. City Engr. Member of firm Fisher Bros., Archts. and Civil Engrs., '96 to date. *Beaudette Block, Pontiac, Mich.*

Philip S. Gardiner, (Mechanical). Sec'y and Gen. Mangr. Eastman, Gardiner & Co., '93-'05. *Laurel, Miss.*

George I. Gavett, (Civil). Sub-Inspector on the Deep Water Channel between Duluth, Chicago and Buffalo, U. S. War Dept., '93-4. Instr. Math. and Sci., Spring Arbor Seminary, Mich., '97-9. Prof. Math. and Eng'g, Fairmount College, Wichita, Kan., '99-'04. Instr. in Applied Math., Leland Stanford Junior Univ., '04-5. *Box 230 Stanford University, Cal.*

Frank R. Gilchrist, (Civil). Lumber and Vessel Business. *491 Russell Ave., Cleveland, O.*

Herbert J. Goulding, (Mechanical). M. Am. Assoc. for Advance. of Sci. D'ftsman Saginaw Mfg. Co., Saginaw, Mich., '93-4. Post Graduate Student, U. of M., '94-5. Instr. in Drawing U. of M., '95-'04. Asst. Prof. Descriptive Geometry and Drawing, U. of M., '04 to date. *904 Lincoln Ave., Ann Arbor, Mich.*

Leon M. Groesbeck, (Mining). Admitted to the Bar of the State of Illinois, '99. *4454 Oakenwald Ave., Chicago, Ill.*

†Leonard F. W. Hildner, (Mechanical). Instr. in Math., Detroit H. S., '94. D'ftsman Detroit Bdge. Wks., '94-6. Chf. D'ftsman Riter-Conley Co. *Allegheny, Pa.*

Theodore H. Hinchman, (Mechanical). A.B., '91. M. Detroit Eng. Soc. M. Am. Soc. Mech. E. D'ftsman, Asst. to Prof. M. E. Cooley, '93. Do. Jesse M. Smith, '93-4. D'ftsman M. C. R. R., '93. Chf. Machinist, U. S. S. Yosemite, '98. Engr. Field & Hinchman, '94-'03. Engr. Field, Hinchman & Smith, '03 to date. *710 Washington Arcade, Detroit, Mich.*

Joseph S. H. Holmes, (Mechanical).

Alfred W. Hookway, (Electrical). Merchant. *Pasadena, Cal.* (?)

*Hiram Howden, (Mechanical). Died at Silver Springs, N. Y., 1894.

Clarence W. Hubbell, (Civil). M. Am. Soc. C. E. M. New Eng. Water Works Ass'n. M. Mich. Eng. Soc., and Sec'y Detroit Eng. Soc. Chf. D'ftsman Detroit Water Works, '93-8. Civil Engr. Detroit Water Works, '98-'05. *Water Office, Detroit, Mich.*

Melburn W. Hull, (Mechanical). D'ftsman Bay City Ind. Wks. Director Manual Training, Pueblo, '97-'05. *323 Broadway, Pueblo, Colo.*

Valentine S. Ives, (Civil). M. Detroit Eng. Soc. D'ftsman Toledo Bdge. Co., '93-5. Civil Engr. for A. P. Ruggles. Computing King Bridge Co., '95. Asst. Engr. Co. Surveyor's Office, Cleveland, '95-8. Treas. J. F. Hartz Co., '98-9. Sec'y Rowley Scale and Supply Co., '00 to date. *44 Congress St. E., Detroit, Mich.*

*Carroll D. Jones, (Electrical). E.E., '97. Inst. Elect. Eng. U. of M. Died at Saranac Lake, New York, in July, 1901.

Fred L. Keeler, (Electrical). *Grass Lake, Mich.*

Alfred C. Marshall, (Electrical). M. Detroit Eng. Soc. Asst. Elect. Insp. Mich. Insp. Bureau, '93-4. Elect. Supt. of Lines and Outside Supt. Pub. Lighting Com., Detroit, '94-9. Chief Engr. Rapid Ry. System, Detroit, '99-'03. Elect. Engr. Detroit Edison Co., '03-5. Gen'l Mngr. Port Huron Light and Power Co., Port Huron, '05. *824 Huron Ave., Port Huron, Mich.*

George H. Miller, (Electrical. D'ftsman F. B. Rae, Elec. Eng., Detroit, '93. Supt. Royal Cycle Wks., Marshall, Mich., '94. Prof. Sci., Marshall H. S., '94-8. Inst. Sci. and Asst. Prin. Blue Island H. S., '98-'04. Mngr. Dept. of Education, Sears, Roebuck & Co., Chicago, '04 to date.
462 Elm St., Blue Island, Ill.

Joseph J. Morsman, (Civil). Engr. and D'ftsman Carter White Lead Co., Omaha, '93-4. Supt. of Cons. do., Chicago, '94-5. Mngr. do., '95-'03. From 1903 to 1905 out of business owing to ill health. *143 East 47th St., Chicago, Ill.*

Llewellyn S. Pomeroy, (Civil). M. U. of M. Eng. Soc. U. S. Sub Insp. Masonry, St. Mary's Falls, '92. Asst. Engr. Sewers, Dayton, O., '93. Instr. Mech. Drawing Y. M. C. A., Kalamazoo, '96-7. U. S. Insp. Plaquemine, Ia., '00-'01. U. S. Insp., Sabine, Tex., '01-2. Asst. Cons. Engr. C. C. C. & St. L. Ry. Co., '02-5. *Guilford, Ind.*

Minott E. Porter, (Civil). C.E., '98. D'ftsman Sears Typo Matrix Co., Cleveland, '94. Computor Hydrographic Office, Navy Dept., '94-7. Computor U. S. Naval Observatory, '97-'01. Asst. Examiner, U. S. Patent Office, '01 to date.
Patent Office, Washington, D. C.

Howard M. Raymond, (Electrical). M. Soc. for the Promotion of Eng. Education. Prof. of Experimental Physics, Armour Institute of Technology, Chicago, '95-'05. Since 1903, Dean of Armour Institute.
Armour Institute of Technology, Chicago, Ill.

Edward S. Reid, (Mechanical). Jun. Am. Soc. Mech. E. Asst. to Prof. Cooley, '94. Chf. D'ftsman Whiting Foundry Equipment Co., Engr. Northern Engineering Wks., Detroit, '99 to date. *733 Second Ave., Detroit, Mich.*

Hugh Rodman, (Electrical). M. Am. Eng. Soc. D'ftsman Coast Survey, Alaska, '93-6. Min. Engr., Alaska, '96-7. Gen. Mngr. C. I. Min. Co., '97-9. Chf. Engr. Willard Storage Battery Co., '55. *56 St. Clair St., Cleveland, O.*

Edwin J. Rosencrans, (Civil). C.E., '00. M. Am. Soc. of C. E. M. Western Soc. of Engrs. Structural D'ftsman J. H. Gray, Chicago, '95. Do. Purdy & Henderson, New York, '95-7. Chf. Engr. Green & Wicks, Archts., Buffalo, '97-8. Mem. of firm Rosencrans & Mott, Chicago, '98-9. Do. Green & Wicks, Archts., Buffalo, '99-'01. Do. Jackson & Rosencrans, Archts., New York, '01 to date. *31 Union Square, New York, N. Y.*

William W. Taylor, (Mining). M. Am. Inst. Min. Engrs. Asst. Chemist Ill. Steele Co., '94-'6. Chemist Mo. Fce. Co., St. Louis, Mo., '96-7. Do. Iron Gate Furnace, Iron Gate, Va., '97-9. Supt. Iron Gate Furnace, '99-'01. Supt. Alleghany Iron and Steel Co., Div. Supt. Empire Steel and I. Co., '01. Gen. Supt. Alleghany Ore and Iron Co., '02 and at present. *Clifton Forge, Va.*

Otto L. E. Weber, (Mechanical). Jun. Am. Soc. Mech. E. M. Mich. Eng. Soc. Supt. and Mngr. Sulphite Fibre Co., '94-'05. *Port Huron, Mich.*

Edward D. Wickes, (Electrical). Assoc. Mem. Am. Soc. C. E. Gen. Engr. up to '99. D'ftsman Carl Binder, C. E., Structural Steel, '99-'00. Do. Riter-Conley Mfg. Co., Pittsburg & Milliken Bros., New York, '00-'01. Engr. Bridge and Bldgs., The Cuba Co., New York, '01-'03. Min. Engr. Gen. Supt. Mines, The Low Moor Iron Co., Virginia, '03-'05. *Low Moor, Va.*

Neil H. Williams, (Electrical). M.S., '95. Supt. Clinton Elec. Co., '93-4. Prof. Sci. W. Bay City H. S., '95-7. Prin. do., '97-8. Instr. Physics and Chem. Central H. S., Detroit, '98-'00. Instr. Physics Shortridge H. S., Indianapolis, '00-'03. Instr. Physics Rose Polytechnic Inst., '03-5. Asst. Prof. Physics do., '05. *1837 N. Eighth St., Terre Haute, Ind.*

Frank A. Windes, (Mechanical). M. Ill. Soc. Engineers and Surveyors. M. Western Soc. Civ. Engrs. and Surveyors. Survey Transp. Bldg., Columbian Exposition. Asst. Supt. Pub. Wks. Bldg. Contractor, '93. Asst. Engr. Winnetka, Ill., '94-6. With Bowen & Anderson, City Eng'rs., Waukegan and Lake Forest Co. City Engr. Winnetka and Glencoe, and Instr. Man. Training, Public Sch. City Engr. Winnetka, '98-'05. Do. Glencoe, '99-'05. Do. Winthrop Harbor, '04-'05. Gen. Civil Eng. and Surveying; special attention given to road and sewers. *Winnetka, Ill.*

Clarence G. Wrentmore, (Civil). M.S., '98. C.E., '01. M. Detroit Eng. Soc. Instr. Des. Geom. U. of M., '93-'02. Asst. Prof. Des. Geom. do., '02-'04. Asst. Prof. C. E. do., '04 to date. D'ftsman Cambria Steel Co., Struc'l Dept., '01-'02. Estimator Cambria Steel Co., Est. Dept., '03. *933 Forest Ave., Ann Arbor, Mich.*

1894.

Abraham K. Adler, (Mechanical). With McDonald Eng. Co., '94-5. Mech. Engr. with Dankmar Adler, Archt., '96-'00. Archt. Treat & Adler, '00-'02. Archt., '02-5. *1641 Monadnock Bldg., Chicago, Ill.*

†Robert L. Ames, (Mechanical). D'ftsman St. Ry. Co., Grand Rapids. Do. City Engr. Office, Kalamazoo, '92. U. S. Lake Survey, '93-4. Asst. Exam. Patent Office, '94 to date. *Washington, D. C.*

†Archibald L. Becker, (Mechanical). D'ftsman Montague Iron Wks., '94 to date. *Montague, Mich.*

John C. Bird, (Mechanical). Machinist Kalamazoo Ry. Velocipede and Car Co., '94. D'ftsman Fox Machine Co., Grand Rapids, '94-7. Do. Geo. D. Wolcott & Son, Jackson, '97. Do. Niagara Machine and Tool Co., Buffalo, N. Y., '98. Do. Brown & Sharpe Mfg. Co., Providence, R. I., '98-9. Asst. Supt. Geo. D. Wolcott & Son, Jackson, '99-'00. D'ftsman Fred'k A. Verdon Co., Hoboken, N. J., '00. Do. Guild & Garrison, Brooklyn, N. Y., '01-2. Mech. Engr. Union Steam Pump Co., Battle Creek, '03-5. *46 Howland St., Battle Creek, Mich.*

†James Blair, (Mechanical). Asst. to Prof. Cooley, '94-5. D'ftsman D. H. Burnham & Co., Arch. Do. Hawley Downdraft Furnace Co., Chicago. *Santa Marta, Columbia, S. A.*

Howard E. Chickering, (Mechanical). D'ftsman Detroit Bridge and Iron Wks., '94-6. Do. Am. Bridge Wks., '96-7. Gas Eng. Expert, Fairbanks, Morse & Co., '97-'05. Branch Mangr. do., '05 to date. *99-101 Water St., Cleveland, O.*

†Harry W. Clark, (Mechanical). Asst. Nat. Blower Co., '95. D'ftsman E. E. Myers, Arch. Supt. Hospital, U. of M. *Ann Arbor, Mich.*

†William C. Conant, (Mechanical). D'ftsman Chicago Screw Co. Do. Fraser & Chalmers. Machinist Am. Spring Co. Die and Tool Maker, Moon Mfg. Co. *Oak Park, Ill.*

Clarence S. Cooke, (Electrical). Instr. Physics, Central H. S., '94 to date. *883 Brooklyn Ave., Detroit, Mich.*

Almon H. Demrick, (Electrical). Asst. Field & Hinchman, '94-5. Supt. and Engr. Scott Bros. Elec. Co., '95-6. Constructing with Hunt Air Co., '96-7. Constructing Engr. Fisher Elec. Co., '97. Elec. Contractor A. H. Demrick & Co., '97-9. Asst. Engr. Gilbert Wilkes, Constructing Engrs., Detroit, '99-'01. Const. and Estimating Engr. Gilbert Wilkes & Co., Denver, Colo., '01-4. Elec. Engr. U. S. Geol. Survey, Salt River Project, Arizona, '04 to date. *Roosevelt, Ariz.*

Herman H. Eymer, (Mechanical). M. Mich. Eng. Soc. D'ftsman Detroit Bridge and Iron Wks., '94-5. Do. Am. Bridge Wks., '95-6. Asst. City Engr. Saginaw, Mich., '96-'01. Co. Engr. and Road Commissioner, Co. Good Roads System, Saginaw Co., '01-3. Civil Engr. and Surveyor, '03 to date. *402 Owen St., Saginaw, Mich.*

Herbert E. French, (Civil). M. Western Soc. of Engrs. With Reedsburg Woolen Mills, '94-7. With C. & N. W. E. E. Co., '97-'04. City Engr. and Supt. of Water Wks., '04-5. *Baraboo, Wis.*

Oscar Greulich, (Civil). Arch. D'ftsman, '94-5. Do. Nat. Blower Co. Do. Illinois Steel Co. (Milwaukee), '96. Heating and Ventilating Engr., Wm. Bayley & Sons Co., '96 to date. *176 S. Bay St., Milwaukee, Wis.*

JOHN C. HAMMOND, (Mechanical). M.S. (Chicago), '97. M. Am. Astron. and Astrophys. Soc. Asst. U. S. Nautical Alamanac Office, '98-'00. Computer U. S. Naval Observatory, '00-'04. Asst. Astronomer do., '04 to date.
U. S. Naval Observatory, Washington, D. C.

†HARRIE D. HAMPER, (Mechanical). Asst. D. L. Barnes, Cons. Eng. With West. Wheeled Scraper Co. *Aurora, Ill.*

†CHARLES J. HARMON, (Electrical). Asst. to Chf. Engr. M. of W., S. E. R. R. With Morgan & Wright, '97-8. Do. Ames & Frost, '98 to date. *Chicago, Ill.*

GEORGE HAYLER, JR., (Mechanical). M. Ohio Electric Light Assoc. Mngr. Gas-Electric Light and Power Co., Van Wert, O., '94-'04. Engr. Arnold Co., Chicago, '04 to date.
121 E. Fourth St., Joplin, Mo.

MAX LICHTENSTEIN, (Civil). Civil Engr. *Elgin, Ill.*

DANIEL B. LUTEN, (Civil). M. Indiana Engr. Soc. M. Indianapolis Technical Club. Instr. Civil Engr., U. of M., '94-5. Instr. Arch. and San. Engr., Purdue Univ., '95-'00. Chf. Engr. Luten Eng. and Const. Co., '00-'01. Chf. Engr. Nat'l Bridge Co., '01-2. Pres. Nat'l Bridge Co., '02 to date. *Indianapolis, Ind.*

RALPH W. NEWTON, (Civil). D'ftsman Detroit Bridge Wks., '94-5. Do. Columbus Bridge Wks., '95. Do. Carnegie Steel Co., '96-7. Do. Riter-Conley Mfg. Co., '97-8. Do. Pittsburg Bridge Co., '98-'00. Do. Am. Bridge Co., '00 to date.
7631 Susquehanna St., Pittsburg, Pa.

FREDERICK C. NOBLE, (Civil). C.E., '04. Assoc. Mem. Am. Soc. C. E. Do. Municipal Engrs. of N. Y. City. Do. Brooklyn Engrs. Club. Rodman St. L. K. & N. W. extension, Summer of '92. Surveyor Christie & Lowe, Contractors, Chicago, '94. D'ftsman J. H. Gray, Structural Engr., Chicago, '95. D'ftsman and Designer Purdy & Henderson, Structural Engrs., New York, '96-7. Structural Engr. Green & Wicks, Archts., Buffalo, '98. Civil Engr. Westinghouse, E. & M. Co., Pittsburg,' 99. Asst. Engr. Rapid Transit Com'n, New York, '00-'02. Structural Engr. Metropolitan St. Ry. Co., Kansas City, Mo., '02. Senior Asst. Engr. Rapid Transit Com'n, N. Y., '03 to date.
4 Court Square, Brooklyn, N. Y.

ROBERT K. PALMER, (Civil). Dftsman, Am. Bdge Wks., '04. Do. New Columbus Bdge. Co., '95. Do. Elmira Bdge. Co., '95-6. Do. Hmailton Bdge. Wks., '96-'00. Chf. Dftsman; do., '00-'04. Asst. Mngr. in charge of bridge design; do., '04 to date.
134 Duke St., Hamilton, Ont.

†WILLIAM P. PARKER, (Civil). Dftsman Detroit Heating & Lighting Co. Do. Detroit Metal and Heating Co. Do. Detroit Dry Dock Co. Do. Kenwood Bdge. Co. Do. Whiting Fdry. Equipment Co. Do. Massillon Bdge. Co. Do. Pittsburg Bdge. Co. Do. Carnegie Steel Co. Do. Keystone Bdge. Wks. Color Sergt. 1st U. S. Vol. Engrs.

Richard Quinn, (Civil). M. Am. Soc. C. E. U. S. Asst. Engr., '95 to date. U. S. Engineer Office, Room N, Custom House. *New Orleans, La.*

†**Oscar Roberts**, (Civil). Missionary, Batanza, W. Africa. *Johannesburg, S. Africa.*

Fred A. Rogers, (Electrical). M. Western Soc. of Engineers. Elec. Engr., Vermillion Milling & Electric Co., '95-6. Asst. in Physics, Lewis Institute, Chicago, '96-7. Instr. in Physics & Elec. Eng.; do., '97-'02. Asst. Prof. Physics & Elec. Eng.; do., '02 to date. *1647 Monroe St., Chicago, Ill.*

Fred A. Sager, (Electrical). Asst. Physics, U. of Ill., '94-5. Instr. in Physics, do., '95-6. Asst. Prof. Physics, do., '96-'03. Elec. Engr., The Arnold Co., '03 to date. *6215 Washington Ave., Chicago, Ill.*

William S. Smith, (Mechanical). *Aurora, Ill.*

Goldwin Starrett, (Mechanical). M. Engr. Club of New York City. Arch. Dftsman & Asst. Engr., D. H. Burnham & Co., Archts., Chicago, '94-8. Supt. Construction, Geo. A. Fuller Co., Pittsburg, '98. Asst. to Gen. Mangr., Geo. A. Fuller Co., New York, '98-'00. Sec'y and Director, Thompson-Starrett Co., New York, '00-'04. 2nd Vice-Pres't E. B. Ellis Granite Co., Northfield, '04 to date. *Northfield, Vt.*

†**George C. Weare**, (Mechanical). With Sherwin Williams Co., Paint and Color Mfrs. *Cleveland, O.*

†**Joseph Weare**, (Civil). Dftsman New Columbus Bdge. Co. Do. Hamilton Bdge. Wks. Do. Mt. Vernon Bdge. Wks. *Mt. Vernon, O.*

1895.

Louis W. Anderson, (Civil). M. Mich. Eng. Soc. Recorder, U. S. Harbor Surveys, '95. Insp. & Dftsman, do., '95-6. Asst. City Engr., Grand Rapids, Mich., '97-9. City Engr., do., '00 to date. *City Hall, Grand Rapids, Mich.*

Walter M. Austin, (Electrical). *Philadelphia, Pa.*

William G. Billings, (Electrical). Asst. to R. R. Commissioner, '95-7. Eng. Chase Constr. Co., '97-'00. Bank cashier, Davison State Bank, '00 to date. *Davison, Mich.*

August Blaess, (Civil). Asst. (Eng. Corps) D. & M. R. R., '95-6. Do., I. C. R. R., '97. Do. Penna. Co., '98. Res. & Asst. Engr. I. C. R. R., '98-'02. Road Supt., I. C. R. R., '02 to date. *Cherokee, Iowa.*

Abraham L. Burgan, (Electrical). M.S., '96. M. Am. Soc. of M. E. Asst. Elect. Dept., Calumet & Hecla Mining Co., '91-2. Asst. Supt., Tamarack Mining Co.'s and Osceola Consolidated Mining Co.'s Stamp Mills, '96-'00. Supt. Isle Royale Copper Co.'s Stamp Mills, '00-'01. Supt. Tamarack Mining Co.'s and Osceola Consolidated Mining Co.'s Stamp Mills, '01-'05. *Hubbell, Mich.*

*Platt R. Bush, (Civil). Levelman Munsing R. R., '95. Asst. Engr. Lehigh Valley Coal Docks. Died at Detroit, October, 1898.

William R. Caldwell, (Civil). Asst. City Engr.. Sault Ste. Marie, '95-6. Asst. Engr., Lake Superior Power Co., '96-7. Junior Engr., U. S. Survey, '99-'01. Do., U. S. Lake Survey, '01-3. City Engr., Traverse City, '03-5. *416 Sixth St., Traverse City, Mich.*

Wallace W. Chickering, (Mechanical). Gas Engine Dept., Fairbanks, Morse & Co., '95-'05. *849 Park Ave., Beloit, Wis.*

Howard M. Cox, (Mechanical). Dftsman Denver Eng. Wks., '95-6. Do. Chisholm, Boyd & White Mach. Co., '96-7. Do. Chicago Edison Co., '97. Cost. Dept., Gates Iron Wks., '97-8. Solicitor of Patents to date. *1133 Manadnock Bldg., Chicago, Ill.*

George A. Damon, (Electrical). Assoc. Mem. Am. Inst. E. E. Active Mem. Western Soc. of Engrs. Asst. to B. J. Arnold, Elec. Engr., '95-9. Associated with B. J. Arnold, '99-'02. Engr., Arnold Electric Power Station Co., '02-4. Managing Engr., Arnold Company, '05 to date. *1539 Marquette Bldg., Chicago, Ill.*

†James H. Dickson, (Electrical), A.B., '94. Asst. to Field & Hinchman, Elec. Engrs. *Detroit, Mich.*

James H. Dunbar, (Civil). M. Western Soc. of Engrs. Dftsman Various Bridge Co.'s., '95-8. Engr. Matthiessen & Hegeler Zinc Co., '98-'03. Mech. Engr., The Grasselli Chemical Co., '03 to date. *468 Giddings Ave., Cleveland, O.*

John H. Dye, (Civil). Engr. to Kingdom of Korea. *Seoul, Korea*

Harvey G. Gilkerson, (Civil). M. Am. Inst. Min. Eng. With M. K. & T. Ry., D. & R. G., and C. C. & C. S. Ry., '95-7. U. S. Dept., Mineral Surveyor for Colorado and Nevada, '97 to date. Civil and Mining Engr. *Goldfield, Nevada*

R. Prosper Gustin, (Mechanical). Jun. Am. Soc. C. E. Dftsman Baldwin Loco. Wks., '96-7. Asst. Engr., Degnon Contracting Co., '97-'05. *13 Park Row, New York City, N. Y.*

Alexander M. Haubrich, (Electrical). Assoc. Mem. Am. Inst. E. E. Supt. Water Wks., Amherstburg, Ont., '93-5. Electric Light & Telephone Const., Detroit, Mich., '95-6. Do., Toledo, Ohio, '96-7. Elec. Engr., Central Union Telephone Co., Chicago, Ill., '97-'01. Sales Engr., Stromberg Carlson Tel. Mfg. Co., '01-5. *c/o Stromberg Carlson Tel. Mfg. Co., Rochester, N. Y.*

Bryson D. Horton, (Electrical). M. Internat'l Elec. Congress. Foreman, Bartlett Ill. Co., Saginaw, '95-6. Asst. Engr. Park and Boulevard Com., Detroit, '96-7. Electrician, Pub. Light Com., '97. Chf. Electrician, U. S. S. Yosemite, '98. Do. Pub. Light Com., '99. Supt. of Construction, Public Light Com., '00. Elect. Engr., Detroit Copper Mining Co., Morenci, Ariz. Ter., '01 and '02. Mngr. Horton-Morehouse Co., '03-4. Arkless Enclosed Fuses, '05. *11-23 Raynor St., Detroit, Mich.*

JOHN HULST, (Mechanical). Dftsman Whiting Foundry Equip. Co., '95-6. Do., Am. Fire Enginee Co., '97-8. Do., Ohio Steel Co., '98-'00. Do., South Sharon Steel Co., '00-'01. Chf. Engr. Mingo Wks., Carnegie Steel Co., '01. Do., Ohio Wks., Carnegie Steel Co., '01 to date. *311 W. Rayen Ave., Youngstown, O.*

MILTON B. HUNTOON, (Electrical). Teacher H. S. *Menominee, Mich.*

CLARENCE T. JOHNSTON, (Civil). C.E., '99. M. Am. Soc. C. E., Association of State Engineers and Wyoming Soc. Civil Engineers and Surveyors. Eng. Corps, State of Wyoming. Irrigation and Reservoir Wk. Stream gauging U. S. Geol. Survey. Asst. State Engr., Wyoming. Asst. Chf. Irrigation Investigations, U. S. Dept. Agriculture, '99-'03. State Engr., Wyoming, '03 to date. *202 East 22nd St., Cheyenne, Wyoming*

HORACE W. KING, (Civil). Dftsman U. S. Surveyor General, Tuckson, Ariz., '98-9. Instrumentman, Isthmian Canal Commission, '99-'01. Provincial Supervisor, Philippines Civil Gov't, '01-2. Res't Engr. Canton Hankow Ry., China, '02-3. U. S. Asst. Engr., Harbor Work, Manila, P. I., '03-'04. Asst. Engr., Reclamation Service, U. S. Geol. Survey, to date. *U. S. Geological Survey, Pendleton, Ore.*

†HARRY V. KNIGHT, (Electrical). Instr. Sc., Alpena H. S., '96 to date. *Alpena, Mich.*

DAVID LE FAVOUR, (Civil). Grad. Student U. of M., '96. Dftsman D. & M. Ry., '96-8. Treas. Bay City Round Hoop Co., '98-9. Dftsman D. & M. Ry., '99-'01. Treas. Wallaceburg Sugar Co., Ltd., '01-'03. Sec'y Treas. and Asst. Mngr., do., '03 to date. *Wallaceburg, Ont.*

HEMAN B. LEONARD, (Electrical). M. Sigma Xi. With Toledo Elec. St. Ry., '95. Dftsman and Engr. Bissell, Dodge & Erner Co. Instr. Math., Kalamazoo H. S., '96-8. Instr. Physics, Racine H. S., '98-'00. Graduate Student, U. of Chicago, '00-'01. Prof. of Math., Ill. Wesleyan Univ., '01-'03. Graduate Student U. of Chicago, '03 to date. *Room 31, North Hall, The University of Chicago.*

RICHARD R. LYMAN, (Civil). M.C.E. (Cornell Univ.) '03. Assoc. Am. Soc. C. E., Prof. Math. and Eng., Brigham Young Acad., Provo, Utah, '95-6. Inst. in Eng., Univ. of Utah, Salt Lake City, '96-7. Asst. Prof. Drawing and Eng., do., '97-'00. Prof. of Civil Eng., do., '00 to date. *1084 Third St., Salt Lake City, Utah*

†THOMAS K. MATHEWSON, (Civil). Inspector Miss. River Imp., '95. Asst. to City Engr., Muscatine, Ia. Gran Pacifico R. R. Surveys, Mexico.

†WILLIAM J. MELCHERS, (Electrical). Elect. Engr. Telephone Exch., '95-8. Mgr. Valley Telephone Co. *Saginaw, Mich.*

CHARLES A. MINER, (Civil). M. Am. Soc. C. E. Computer, U. S. Engrs., 4th Dist. Miss. River Comm'n, New Orleans, La., '94-5.

Surveyor, U. S. Engrs., U. S. Engr. Dist. Fortifications, New Orleans, La., '05. Asst. Engr., do., '95-8. First Lt. 3d U. S. Vol. Engrs., '98-9. Asst. Engr., U. S. Engr., Washington, D. C. Fortifications, '99-'02. Private practice, New York, '02. Princ. Asst. Engr., U. S. Engrs., River and Harbor Imp., Wilmington, Del., '02-4. Treas. and Business Mgr. Atlantic Dredging Co., Phila., '04, to date. *230 East Washington St., Petersburg, Va.*

†CHARLES H. MORSE, JR., (Mechanical). M.E., '97. Asst. Mfg. Dept., Fairbanks, Morse & Co., '97. Sales Dept. do., '98. Mech. Engr., do., '99. *Chicago, Ill.*

JOHN F. NICHOLS, (Mechanical). Machinist, F. W. Wheeler Co., '95. Dftsman, do., '95-7. Do., Bay City, Ind. Wks., '97-8. Do., Newport News Ship Build. and Dry Dock Co., '98-9. Leading Dftsman do., '00 to date. *R. F. D., Hampton, Va.*

†ELBERT NICHOLSON, (Mechanical). Asst. G. S. Pierson. Asst. to City Engr., Sterling, Ill. With John A. Cole, Civ. Engr. *Chicago, Ill.*

MARIAN S. PARKER, (Civil). Structural Engr., designing, Purdy & Henderson, '95-'05. *78 Fifth Ave., New York City.*

†ALBERT S. PASSOLT, (Electrical). Asst. to Prof. Carhart, '95-6. Elect. with Field & Hinchman, Detroit, '96. Do. Bartlett Illum. Co., Saginaw, '96-7. Do. U. of M., '97. Supt. Elec. Light Co., '98 to date. *Columbus, Miss.*

*CLARENCE H. PERRY, (Civil). Eng. Corps, Chicago N. Side R. R. Died at Chicago, March, 1896.

SETH E. ROBERTS, (Civil). Dftsman King Bdge. Co., '95-7. Do., Webster, Camp & Lane, '97-8. Do., in charge of squad, Detroit Plant, Am. Bdge. Co., '98 to date. *55 Park Ave., Detroit, Mich.*

WILBUR G. SALTER, (Mechanical). Dftsman Andrews & Johnson, Heat. and Vent. Engrs., '95. Asst. Engr., City of Chicago, '95-6. Dept. Mgr., Gen. Mgr., Sec'y, Treas. Troy Bakery Co., '96-9. Pres. and Treas. Salter-Holmes Mfg. Co. (Bicycle Sundries), '98. Mngr. F. Salter & Co. (wholesale liquors), '99-'00. Technical Mngr. (Consulting) Hapgoods, '04-'05. Consulting and contracting, Building, Apartments, etc., Promoting Electric Rys., Investments, etc., Brokerage, W. G. Salter & Co., Brokers, '00 to date. Mngr. Colcord & Salter, Archts., '04 to date. *6557 Perry Ave., Chicago, Ill.*

†WILLIAM SCHAAKE, (Mechanical). Dftsman, Kenwood Bdge. Co., '95. Designer, Sligh Bicycle Co., '96. Dftsman Shaw Elec. Crane Co., '97-8. Crane Dept. Pauling & Harnischfger, '98 to date. *Milwaukee, Wis.*

EMMET SCOTT, (Mechanical). Stationary Engr., bookkeeper, Asst. in office, Supt. Constr., Niles & Scott Co., LaPorte, Ind., '95-'03. Treas. Petoskey, Bay View & Northern Gas Co., Petoskey, '02 to date. Pres't LaPorte Gas Meter Co., just organizing. *LaPorte, Ind.*

†FREDERICK G. SKINNER, (Civil). Dftsman and Transitman, Metrop. St. Ry. *Kansas City, Mo.*

†LESTER A. STANLEY, (Electrical). With Karoly Elec. Co., and Amer. Gas Engine Elec. Co., Chicago, '95-6. Instr. Physics and Elec. Eng. *Provo City, Utah.*

ISAAC F. STEEN, (Civil). With Wm. Sooy Smith, '95. Dftsman with Purdy & Henderson, Chicago, Ill. *Chicago, Ill.*

EDWARD M. ST. JOHN, (Civil). U. S. Insp. Masonry, St. Mary's Falls Canal, '92-3. Asst. Engr. L. S. & M. S. R. R., '95-8 Dftsman Mo. Valley Bdge. Works, '98 to date. *Leavenworth, Kan.*

ROBERT C. STEVENS, (Mechanical). A.B., '94. M. Am. Soc. M. E.; M. Ind. Eng. Soc.; M. Indianapolis Technical Club. Mech. Eng., Atlas Engine Wks., Indianapolis, '95-8. Instr. Mech. Eng., U. of M., '98-9. Consulting Engr., Giddings & Stevens, Rockford, Ill., '99-'01. Mech. Engr., Atlas Engine Wks., '01 to date. *2037 Ashland Ave., Indianapolis, Ind.*

WELLINGTON C. TATE, (Electrical). Supt. Const. Ohio Penitentiary. Supt., Newberry Water & Light Co., '97-'00. Do., Munising Elec. Light & Power Co., '00-'04. Supt. Electric Power Dept., Munising Paper Co., '04-'05. *Munising, Mich.*

NELSON J. TUBBS, (Civil). *Dexter, Mich.*

FRANK F. VAN TUYL, (Electrical). M. Detroit Eng. Soc. With Gilbert Wilkes, '95-6. Bissel, Dodge & Erner Co., Toledo, '97-8. B. J. Arnold, Chicago, '98. Electrician, Det., Ypsilanti & Ann Arbor Ry., '98-'00. Do., Washtenaw Electric Co., '00-'01. Treas. and Mangr., Gilbert Wilkes & Co., '01-2. Asst. Treas., Kokomo Ry. & Light Co., '01-2. Gen. Mangr., Owosso & Corunna Elect. Co., '02-4. Consult. Engr., '02 to date. *1112 Union Trust Bldg., Detroit, Mich.*

VANCE P. WILKINS, (Civil). Dftsman to City Engr., Akron, O. Asst. Engr. St. L. & S. W. R. R. *Texarkana, Tex.*

GEORGE B. WILLCOX, (Mechanical). M.E., '01. M. Am. Soc. M. E.; M. Mich. Eng. Soc. Testing Engr., F. W. Wheeler & Co., '95. Engine Designer, Do., '96. Cons. Engr. and Patent Solicitor, Bay City, '97-'05. Instr. Mech. Engr., U. of M., '98, '00, '02. Mangr., Willcox Engine Co. (Inc.), '05 to date. *407 Eddy Bldg., Saginaw, Mich.*

HOMER W. WYCKOFF, (Electrical). Supt. Const. Conduits for City Lighting, Detroit, '94. Do., Cen. Union Telephone Co., Toledo, '95. Ass't Engr. do., Chicago. Engr. Const. Conduits, Indianapolis, '96. *Chicago, Ill.*

1896.

MORTIMER G. BARNES, (Civil). C.E., '01. M. Am. Soc. C. E. U. S. Insp. on Poe Lock, Sault Ste. Marie, Mich., '92-3. Asst. City Engr., Ann Arbor, '94. U. S. Insp. on Poe Lock and Power House, '95-6. Princ. Asst. Engr., Lake Superior Power Co., '96-7. U. S. Surveyor, Birmingham Canal, Alabama, '97-8. Chf.

Engr., Chandler-Dunbar Power Co., Sault Ste. Marie, '98. Instrumentman U. S. Deep Water Ways, '98-9. U. S. Junior Engr. on design and construction, Ill. & Miss. Canal, '99-'04. U. S. Asst. Engr., do., '04 to date. *Geneseo, Ill.*

WILLIAM C. BORST, (Electrical). Engr. Corps D. & R. G. R. R., '96. Instr. Physics and Drawing, Man. Training H. S. *Denver, Col.*

HARRY C. BUELL, (Mechanical).

WALTER J. CAHILL, (Civil). M. Western Soc. of Engrs. Rodman and Mas'ry Insp., Ill. Cent. R. R. Co., '96-7. Levelman, Kankakee Drainage Com., '97. Rodman and Leveller, Chicago, Hammond & West. Ry., '97. Instrument man, Ill. Cent. R. R., Road Dept., '97. Rodman, City of Chicago (Tunnels), '97-8. Asst. Engr., City of Chicago (Harbors), '98. Do., City of Chicago (Pumping Stations), '99. Do., City of Chicago (Gen'l Construction), '99-'00. Do., City of Chicago (Bridge Construction), '00-'01. Office Engr., Lydon & Drews Co. (Sub-structures, Dredging, Breakwaters), '01-'02. Treas., do., '02-'03. Treas. and Asst. Gen'l Mangr., Chicago & Great Lakes Dredge & Dock Co., '03 to date. *18 Gilpin Place, Chicago, Ill.*

WILLIAM A. CALDWELL, (Electrical). With Bell Tel. Co., '96-8. Missouri Edison Co., '98 to date. *St. Louis, Mo.*

*PHILIP R. COATES, (Electrical). Dftsman, Merrimack Mfg. Co., '96-9. Died ....

BURNHAM S. COLBURN, (Civil). M. Detroit Eng. Soc. Dftsman, Detroit Bdge. & Iron Wks., '96-7 and '99-'00. Res. Engr., Victoria Jubilee Bdge., Montreal, '97-9. Sec'y and Treas., The Canadian Bdge. Co., Ltd., '00 to date. *Walkerville, Ont.*

JOHN C. CONDON, (Electrical). Dftsman, Portage Lake Foundry & Mach. Co., '97-8. Do., Calumet & Hecla Mining Co., '98-9. Clerk, First Nat'l Bank, Hancock, '99 to date.
732 Hancock St., Hancock, Mich.

JESSE I. CONKLIN, (Civil). U. S. Insp. Masonry, Sault Ste. Marie, '92-6. Overseer, Fort St. Philip, La., '96-7. Chief Insp., Plaquemine Locks, '97-'03. U. S. Asst. Engr., do., '03-5.
U. S. Engineer Office, Plaquemine, La.

MERRITT S. CONNER, (Electrical). Various Engineering positions with the Western Electric Co., Chicago, '96-'03. Chf. Engr., Stromburg-Carlson Telephone Mfg. Co., '03 to date.
83 Brunswick St., Rochester, N. Y.

WILLIAM C. CORYELL, (Mechanical). Machinist, M. C. R. R., '96-8. Dftsman, Baldwin Loco. Wks., '98. Do., L. S. & M. S. Ry. Do., Otis Steel Co. Chf. Dftsman, with Carnegie Steel Co., Ohio works and furnaces for the last four years.
Youngstown, Ohio.

FRED R. CUTCHEON, (Electrical). With Western Elect. Co., '97. Electrn. St. Paul Elect. Lt. Wks., '97 to date. Sergt. Co. G, 2d U. S. Vol. Engrs. *St. Paul, Minn.*

FRED A. ECKERT, (Mechanical). Instr. Machine Shop, Chicago Manual Training Sch., '96-9. Supt. Northern Eng. Wks., '99 to date. *1090 Fourth Ave., Detroit, Mich.*

CHARLES M. EDDY, (Mechanical). Supt. Meter Dept., The Toledo Traction Co., '96-8. Eddy & McColl, Elec. Engrs. and Contractors, '98 to date. *223 Huron St., Toledo, Ohio.*

JAY D. EDMONDS, (Mechanical). Chf. Dftsman, Chicago Screw Co., '98. Mech. Engr., Fischer Equipment Co. Edmonds & Metzel. Turner Brass Wks. *4752 Prairie Ave., Chicago, Ill.*

CHARLES W. ELLIS, (Electrical). Bell Tel. Co., Chicago. Gas Engine Dept., Fairbanks, Morse & Co., Beloit, Wis. Westinghouse Mach. Co. *Pittsburgh, Pa.*

RICHARD D. EWING, (Civil). Instr. Math., Ishpeming. Supt. Schools, Champion, Mich. Supt. Schools, Escanaba, Mich., '99-'01. With American Book Co., '01 to date. *712 N. Tejon St., Colorado Springs, Colo.*

THOMAS H. FERGUSON, Ph.B., '95, (Civil). Dftsman, Pub. Light Com'n, Detroit, '96-7. Contractors' Engr. Monongahela Navigation Impt., '97-8. Asst. Examiner, Patent Office. Patent Attorney, General Electric Co., '03 to date. *282 Parkwood Boulevard, Schenectady, N. Y.*

JOHN W. FITZGERALD, (Mechanical). E.E. (Mass. Inst. Tech.), '97. Western Elect. Co., '97-9. FitzGerald & Marquardt Eng. Co. *San Juan, Porto Rico.*

BURT L. FOSTER, (Mechanical). Machinist, Solvay Process Co., Detroit, '97. Erecting Engr., The Marsden Co., Phila., '98. Insp. Simplex Ry. Appliance Co., Chicago, '98. Dftsman, Crane Elevator Co., Chicago, '99. Insp. Robert W. Hunt & Co., Chicago, '99 to date. *C/o Robt. W. Hunt & Co., 1121 The Rookery, Chicago.*

SERGIUS P. GRACE, (Electrical). E.E., '04. M. Am. Institute of E. E. M. Engrs. Soc. of Western Penna. Elec. Engr., Detroit Telephone Co., '96-8. Chf. Engr., New State Tel. Co. of Mich., '98-9. Do., People's Telephone Co. of New Orleans, La., '99-'00. Supt. Southwestern Bell Telephone Co., '00-'02. Chf. Engr., C. D. & P. Telephone Co. (Bell), Pittsburg, '02 to date. *416 7th Avenue, Pittsburg, Pa.*

ALBERT E. GREENE, Ph.B., '95, (Civil). Assoc. Mem. Soc. C. E. M. Detroit Eng. Soc. Cement Tests, Herr's Isl. Dam, '96. Asst. U. of M., '96-7. Dftsman, Detroit Bdge. & Iron Wks., '97-9. Asst. Engr., Duluth, Masaba & Northern Ry., '99-'00. Dftsman, Canadian Bdge. Co., Ltd., '01-3. Asst. Prof. C.E., U. of M., '04 to date. *415 E. William St., Ann Arbor, Mich.*

DWIGHT M. GUILLOTTE, (Mechanical). With Master Mech. and Erecting Dept. Ann Arbor R. R. *Owosso, Mich.*

Paul Hamilton, (Civil). Junior Engr., U. S. River and Harbor Imp. Wk., '97-'00. Asst. Engr., Cleveland, Cincinnati, Chicago & St. Louis Ry., '00-'02. Engr., Maintenance of Way, do., '02 to date. *C/o C. C. C. & St. L. Ry., Springfield, Ohio.*

George H. Harrington, (Civil). Rodman, Carter Oil Co., '97-8. Transitman, do., '98-9. Foreman, Gas Department, do., '99-'00. Lease Foreman, do., '00-'02. Asst. District Supt., do., '02 to date. *Pennsboro, W. Va.*

John S. Hoadley, (Civil). Dftsman and Rodman, T. &. N. W. Ry., '97-8. Co. Surveyor, Williams Co., Ohio, '98-'01. Asst. Engr., Cincinnati Northern R. R., '01 to date. *227 South Avenue, Van Wert, Ohio.*

Edward B. House, (Electrical). Prof. Math., Col. Agl. Coll. *Fort Collins, Col.*

Edwin D. Hoyt, (Mechanical). A.M. (Western Univ. of Penna.), '04. Instr. Man. Train., Jewish Train. Sch., Chicago, '90-3. Instr. Man. Train., Muskegon H. S., Mich., '96-7. Prin. Hackley Man. Train. Sch., Muskegon, '97-'00. Prin. First Ward Man. Train. Sch., Allegheny, Pa., '00-'03. *25 Clifton Avenue, Allegheny, Pa.*

John W. Irwin, (Civil). City Engr. *Mt. Clemens, Mich.*

Hugh C. Jackson, (Civil). Asst. Engr., R. H. McConaghy, Newcastle, Pa., '95-6. Dftsman, Gillette Mfg. Co. *Minneapolis, Minn.*

Julius Kahn, (Civil). C.E. '99. Assoc. Mem. Am. Soc. C. E. Mem. Mich. Engr. Soc. Dftsman, Union Bdge. Co., Athens, Pa., '96. Asst. Engr., Bushwick Iron Wks., Brooklyn, '97. Dftsman, Brooklyn Navy Yards, '97. Asst. Engr., C. W. Hunt Co., '98, '99, '00. Chf. Engr., Sulphur Mines, Japan, '01, '02. Practicing Consulting Engr., Detroit, '03 to date. Pres't Trussed Concrete Steel Co., Detroit, '03 to date. *Wayne Co. Bank Bldg., Detroit, Mich.*

Albert L. Kalmbach, (Mechanical). Dftsman, Ohio Steel Co. *Youngstown, O.*

Hugh B. Kelly, (Civil). Rodman, C. M. & St. P. Ry., '96. Asst. to various Chicago Surveyors, '96-'98. Axeman, Rodman, Asst. Engr., C. & N. W. Ry., '98-'02. Detailing and checking, Purdy & Henderson, Chicago, '02-4. Do., Ill. Steel Co., North Wks., Chicago, '04. Detailing, Ritter & Mott, Chicago, '04-5. Detailing and checking, Purdy & Henderson, Chicago, '05 to date. *17 S. Humboldt St., Chicago, Ill.*

Guy T. Lamont, (Mechanical). Mgr. Lamont's Sash and Door Factory. *Bay City, Mich.*

Thomas B. Lee, (Civil). *Coldwater, Mich.*

Thomas D. McColl, (Electrical and Mechanical). M. Univ. of Mich. Eng. Soc. Elec. Engr. Light and Powere Co., Chelsea. Do., Bissell, Dodge & Erner Co., Toledo. Eddy & McColl, Elec. and Mech. Engrs., '98-'05. *410 Sherman St., Toledo, O.*

GEORGE T. McGEE, (Civil). M. Am. Soc. Min. Engrs. Clerk and Leveller, Ill. and Miss. Canal, (U. S. Gov't work), '92-5. Mining Engr., Moffet-Smith Mines, Leadville, Colo., '96-7. Do., De La Mar Gold Min. Co., Nevada. Do., Anaconda Copper Mining Co., Butte, Mont. Do., Great Boulder Perseverance G. M. Co., Kalgoorlie, W. Australia. Asst. Supt., Anaconda Copper Mining Co., '01-2. Supt., Gagnon Mine, Colorado Smelting & Mining Co., '03 to date. Asst. Supt., Butte & Boston Con. Mining Co., '03 to date. *1009 Caledonia St., Butte, Mont.*

GEORGE K. McMULLEN, (Electrical). M. Mich. Eng. Assoc. Special, Citizens Telephone Co., Grand Rapids, '96-7. Mangr., Business Furniture Co., Grand Rapids, '97-8. Sales Mangr., Fox Machine Co., '98-'05. *816 Fountain St., Grand Rapids, Mich.*

CARL R. MARQUARDT, (Mechanical). Dftsman, Am. Shipbuilding Co., Cleveland, '96-8. FitzGerald-Marquardt Eng. Co., San Juan, P. R., '98-'00. In charge of all merchant marine, Bath Iron Wks., Bath, Me., '00-'02. Mech. Engr., Pacific Ice Co., San Francisco, Cal., '03. Do., E. L. Phillips & Co., New York City, '04. Gen'l Eng. Practice, '05. *519 Parrot Bldg., San Francisco, Cal.*

CLYDE S. MASON, (Mechanical). Dftsman, M. C. R. R. Shops, '96-9. Chf. Dftsman M. C. R. R., '99-'00. Div. Engr., Lackawanna Steel Co., Buffalo, N. Y., '01-4. Chf. Engr., Retort Coke Oven Co., Cleveland, '04 to date. *24 Crawford Place, Cleveland, O.*

HERBERT W. MERRILL, (Mechanical). Machinist., Mitts & Merrill. *Saginaw, Mich.*

HARRY Y. MILLS, (Civil). *Toledo, O.*

GUY D. NEWTON, (Mechanical). Dftsman, Julian Kennedy, Pittsburg, '99-'00. Chf. Dftsman, Penna. Malleable Co., '00-'01. Dftsman, Lorain Steel Co., '01. Do., Garratt & Cromwell Eng. Co., Cleveland, O., '01-2. Do., The Nat'l Supply Co., Toledo, '02 to date. *346 Delaware Ave., Toledo, O.*

LEE L. NEWTON, (Civil). *Lake Linden, Mich.*

WALTER K. O'BRIEN, (Electrical). Chf. Engr. Am. Luxfer Prism Co., '96 to date. *160 5th Ave., New York, N. Y.*

ARTHUR P. O'BRIEN, (Civil). Represent'g Amer. Luxfer Prism Co. *160 5th Ave., New York, N. Y.*

HENRY B. OTIS, (Electrical). Telephone Co., '97. Amer. Luxfer Prism Co., '98. *973 Washington Blvd., Chicago, Ill.*

CHARLES G. PALMER, (Electrical). *Detroit, Mich.*

LEWIS M. PARROTT, (Electrical). Principal H. S. *St. Johns, Mich.*

JAMES M. RAIKES, (Civil). *1020 N. 6th St., Burlington, Ia.*

BEN C. RICH, (Civil). Instrument man, C. H. & W. R. R., '96-8. Builder, '98 to date. *6504 Howard Ave., Chicago, Ill.*

WALTER ROBBINS, (Electrical). West. Elec. Co., '96-7. F. B. Rae Eng. Co., '97. Pierce and Richardson, '97-8. West. Elec. Co., '98. *C/o West Elec. Co., Chicago, Ill.*

EDWARD J. RYAN, (Electrical).
211 W. Warren Ave., Detroit, Mich.

RICHARD E. SACK, (Electrical). Edison Illum. Co. Light & Power Co., Albert Lea, Minn. *Albert Lea, Minn.*

GEORGE R. SNOVER, (Mining). Mining Engr.
San Juancito, Honduras.

FRANK C. SOPER, (Electrical). Designer, Amer. Luxfer Prism Co., '96-9. West. Elec. Co., '99. *Chicago, Ill.*

CHARLES H. SPENCER, (Civil). Asst. to City Engr., Ann Arbor. M. of W. Dept., L. S. & M. S. R. R. *Toledo, O.*

WILL T. STEBBINS, (Electrical). Ship Bldg. & Dry Dock Co.
Newport News, Va.

ADRIAN D. STEVENSON, (Electrical). Journalism. *Detroit, Mich.*

FRANKLIN V. V. SWAN, (Electrical). *Flint, Mich.*

GEORGE W. TANNER, (Electrical). Instr. St. John's Sch.
Salina, Kan.

WARREN K. THOMPSON, (Mechanical). Machinist, Brown Hoist. & Conv. Mach. Co. Erector for do. *Cleveland, O.*

CHARLES K. VAUGHAN, Ph.B., (Hillsdale), (Civil). Dftsman, S. Halsted St. Iron Wks. *Chicago, Ill.*

HARRY C. WEARE, (Mechanical). Moulton Starrett Const. Co., Chicago, '96-7. Rep'g Amer. Luxfer Prism Co. *Boston, Mass.*

LAVERGN L. WHEELER, (Electrical. *Sandstone, Mich.*

FRANK S. WHITMAN, (Civil). *Buchanan, Mich.*

VICTOR R. WILLOUGHBY, (Mechanical). Solvay Process Co., '96-7. Dftsman, Mich. Penin. Car Co., '97 to date. *Detroit, Mich.*

CARL B. WILLIAMS, (Civil). Civil Eng'g.
155 La Salle St., Chicago, Ill.

LOUIS A. WOODARD, (Mechanical). Loco. Shops L. S. & M. S. R. R., '96-7. Dftsman, do., '97-8. Do., Ohio Steel Co., '98 to date.
Youngstown, O.

SILAS H. WOODARD, (Civil). Pneumatic Caisson Fndn. Co. Wk., N. Y., '96-7. Purdy & Henderson, '97-8. Dutton Pneumatic Lock & Eng'g Co., '98-9. Asst. Engr. U. S. Bd. Engrs. Deep Waterways, '99. *Detroit, Mich.*

*EDWIN F. WOODRUFF, (Mechanical). Supt. J. S. Stearns Lumber Co., Odanah, Wis. Act. Asst. Engr. U. S. N. Died at Ludington, June, '98.

GROVER H. WOODS, (Electrical). State Insp. Pub. Wks., '96-8. Elec. Engr. Syracuse Const. Co., '98 to date. *Syracuse, N. Y.*

HENRY L. WOOLFENDEN, (Electrical). M.S., '97. E.E., '04. M. Colo. Branch Am. Inst. E. E. Asst. to Gilbert Wilkes, Consulting Engr., '97-9. Junior partner, Gilbert Wilkes & Co., '99-'00. Treas. Gilbert Wilkes & Co., Inc., '00-'01. Pres't. do., '01-5.
1649 Tremont St., Denver, Colo.

1897.

Fred L. Baker, (Mechanical). Elec. Lighting, U. of M., '97-8. Machinist, M. C. R. R. Dftsman, Loco. Wks., '98 to date. *Schenectady, N. Y.*

Mark Bary, (Electrical). With City Engr. *St. Louis, Mo.*

Arthur W. Birdsall, (Electrical). *Cleveland, O.*

Deward A. Britten, (Electrical). Elect. Lighting, U. of M., '98. Mich. Elect. Co., Detroit, '98-9. With D. Y. & A. A. Ry., '99. *Ann Arbor, Mich.*

Frederick H. Burdick, (Civil). With Riter & Conley. *Pittsburg, Pa.*

Melancthon W. Campau, (Mechanical). With Gilbert Wilkes. Dftsman, Dry Dock Co. Naval Reserves, U. S. S. Yosemite. *Detroit, Mich.*

Ralph Collamore, (Mechanical). Dftsman, Field & Hinchman, '97. *Detroit, Mich.*

Emmons Collins, (Electrical and Mechanical). Dftsman, Whiting Fndry. Equipment Co. *115 Monroe St., Chicago, Ill.*

Charles Cottingham, B.C.E. (Purdue). C.E. City Engr. *Danville, Ill.*

Wilbert S. Drew, (Mechanical). Instr. Man. Train. Sch., Toledo. Arch. Dftsman. *Newton, Mass.*

Elmer M. Ellsworth, (Civil). U. S. Deep Waterways Survey, '97-8. *Thornville, Mich.*

Thaddeus L. Farnham, (Mechanical). Gas Eng. Dept., Fairbanks, Morse & Co., Beloit, '97-8. Gas Eng. Expert do., Chicago, Kansas City, etc., '98 to date. *Beloit, Wis.*

Henry Geismer, (Civil). Leveler, Birmingham Canal Survey, '97. Surveyor, Sloss Iron & Steel Co. Asst. Engr. Tallassee Falls Mfg. Co. *Tallassee, Ala.*

Melvin A. Gilbert, (Civil). M. Engr's. Soc. of Western Penna. Dftsman, Riter-Conley Mfg. Co., Allegheny, Pa., '98-9. Do. Schiffler Bdge. Co., '99. Checker and Squad Foreman, Riter-Conley Mfg. Co., '99-'04. Checker, Penna. Bdge. Co., '04 to date. *Lock Box 163, New Brighton, Pa.*

Henry T. Harrison, (Electrical). Dftsman, Wellman-Seaver Eng. Co., '98-'00. Do. Am. Steel & Wire Co., '00-'01. Do. Garrett, Cromwell Eng. Co., '01-2. Mech. Engr., Osborn Eng. Co., '02 to date. *Suite 5, The Belgrave, Cleveland, O.*

Frederick W. Henninger, (Electrical).

Loomis Hutchinson, (Electrical). Testing Boilers. Dftsman, Sterling Boiler Co. U. S. S. Yosemite. *Barberton, O.*

Carlyle Kittredge, (Electrical). With Bissell, Dodge & Erner, Toledo, '97. Asst. Engr., F. M. Dunlap, Detroit, '98. Elect. Plant, Van Wirt, O. *Ann Arbor, Mich.*

JOHN G. LEWIS, (Electrical).
424 North Oak Park Ave., Chicago, (Oak Park)

ELMER D. LYON, (Mechanical). Dftsman, Standard Boiler & Bdge. Co., Bellaire, '97-8. Do. Metrop. Elev. R. R., Chicago, '98-9. Salesman, Amer. Blower Co., Detroit. Dftsman, Whiting Foundry & Equipment Co., Harvey, Ill., '00-'03. Do. Bucyrus Co., S. Milwaukee, Wis., '03 to date. *Box 21, S. Milwaukee, Wis.*

WILLIAM F. MARTIN, (Mechanical). With Eng. Dept., A. T. & S. F. Ry. Co., '97-'00. Designer, The Scherzer Rolling Lift Bdge. Co., '00 to date. *1034 Park Avenue, Chicago, Ill.*

THOMAS F. MCCRICKETT, (Mechanical). M. Am. Soc. M. E. M. Detroit Eng. Soc. Dftsman, Bay City Ind. Wks., '95-6. Engr., Russel Wheel & Foundry Co., '97 to date.
Plaza Hotel, Detroit, Mich.

J. HAROLD MONTGOMERY, (Electrical). M.S. '98. M. Detroit Eng. Soc. Owner Mich. Apparatus Co., Ann Arbor, '98-'01. Asst. Engr., Field, Hinchman & Smith, '01-4. State Elec. Inspector, Mich. Inspection Bureau, Detroit, '04 to date.
401 Wayne Co. Bank Bldg., Detroit, Mich.

HENRY E. MOORE, (Civil). Asst. Engr. Bdges and Bldgs., C. & W. M., & D. G. R. & W. R. R. *Grand Rapids, Mich.*

LYMAN F. MOREHOUSE, (Eelectrical). A.M. '04. M. Am. Physical Soc. Instr. in Phys. and Chem., Marquette H. S., '97-'00. Graduate Student, Univ. of Chicago, Summer of '00. Instr. in Math., Detroit Central H. S., '00-'01. Asst. in Elec. Engr., U. of M., '01. Instr. in Phys., Wash. Univ., St. Louis, '01-2. Instr. in Physics, U. of M., '02 to date. Practical work in Elec. Eng. and graduate work in Physics during Summers from '01 to date.
923 Greenwood Ave., Ann Arbor, Mich.

CHARLES H. MORITZ, (Electrical). M. Electro-Chemical Soc. Assoc. M. Am. Inst. E. E. Do. Am. Soc. C. E. Do. Canadian Soc. C. E. Dftsman, Valley Tel. Co., Saginaw, '97-8. Insp., Mich. Lake Superior Power Co., Sault Ste. Marie, '98-9. Asst. Engr., Shawmigan Water & Power Co., Shawmigan Falls, '99-'01. Constr. Engr., Pittsburg Reduction Co., Niagara Falls, '01-3. Asst. Supt. do., '03-4. Supt., Northern Aluminum Co., Shawmigan Falls, '05. U. S. S. Yosemite, '98.
Shawmigan Falls, P. Q., Canada.

WILLIAM F. V. NEUMAN, (Electrical). Lineman, Elect. Rd. Do. Chase Constr. Co., Detroit. Mangr., Wm. E. Metzger's Automobile Repository, '01 to date.
265 Jefferson Ave., Detroit, Mich.

JOSEPH PERRIEN, B.S. (Mich. Agr. Coll.), (Mechanical).
440 Brush St., Detroit, Mich.

GEORGE C. PRATT, (Electrical). Supt., Barrington Elect. Light Co., '97-8. Audit. Dept. West. Elec. Co., '98-9. Mngr. do., '99 to date. *Chicago, Ill.*

William H. Rippey, (Civil). M. U. of M. Eng. Soc. Recorder, U. S. Survey, Birmingham Canal, '97. Asst. Engr., Birmingham Traction Co., '98. Dftsman, Keystone Bdge. Works, Pittsburg, '99. Do. Shiffler Bdge. Co., Pittsburg, '00-'01. Do. Toledo Branch Am. Bdge. Co., '02-3. Engr. and Dftsman, Trussed Concrete Steel Co., Detroit, '03 to date.
56 Breckenridge St., Detroit, Mich.

Frederic C. Roberts, B.S. (Earlham), (Civil). *W. Elkton, O.*

Francis J. Seabolt, (Mechanical). L.L.B. (Nat'l Univ., Washington, D. C.) '04. With Stephenson Mnfg. Co. Post Graduate U. of M., '99-'00. Dftsman, N. Y. Ship Building Co., Camden, '00-'01. Examiner, U. S. Patent Office, Washington, D. C., '01-4. Student, Columbian Univ. Law School and Nat'l Univ. Law School, graduating from the latter in '04. Patent Attorney, Gen'l Electrical Co., '04-5.
58 Washington Ave., Schenectady, N. Y.

Charles G. Simonds, (Mechanical). Morton Mfg. Co., Muskegon, '97. Shaw Electric Crane Co. Filer & Stowell Mfg. Co., '98. Dftsman, T. L. Smith. Do. Milwaukee Bdge. Wks.
Milwaukee, Wis.

Weston Small, (Civil). Transitman, Ill. Cent'l R. R., '98-9. Dftsman, U. S. Engr. Office, Sioux City, Ia., '99-'01. Dftsman, and Computer, City Engr. Office, Sioux City, Ia., '01-2. Surveyor, U. S. Engr. Office, Yellowstone Park, '02-3. Dftsman and Surveyor, U. S. Engr. Office, Sioux City, Ia., '03-5. *Sioux City, Ia.*

Emil G. Struckman, (Mechanical). Fairbanks, Morse & Co.
Beloit, Wis.

Arthur C. Tagge, (Electrical). M. Am. Soc. M. E. Dftsman, Frontier Iron Wks., Detroit, '97. Construction man, Bissel, Dodge & Erner, Toledo, '97. Dftsman, Link-Belt Mach. Co., Chicago, '98-9. Do. Osborne Eng. Co., Cleveland, '00. Supervising Engr., do., '00-'01. Mill Supt., Peninsular Portland Cement Co., Jackson, Mich., '01-2. Engr., International Portland Cement Co., '02-5. *17 Blackburn Ave., Ottawa, Ontario, Can.*

Melvin S. Trevidick, (Electrical). Dftsman, Chicago Ship Building Co., '97-'00. Do. Fraser & Chalmers, Chicago, '01-2. Chf. Dftsman, Hoover, Owens & Rentschler, Hamilton, Ohio., '02-3. Do. Great Lakes Eng. Wks., Detroit, '03 to date.
122 Rosedale Ct., Detroit, Mich.

*Alexander G. Unsold, (Mechanical). Dftsman, Detroit Stove Wks., '97-8. Leveler for City Engr., '99. Died ....

Frederick E. Vickers, (Electrical). Associate Am. Inst. E. E. Elect. Transmission. Electrician, DeLaMar's Nevada Gold Mining Co., '98-'00. In charge of power transmission plant, Four Hills Mine, Beverly, Sierra Co., Cal., '00-'01. Expert, General Electric Co., San Francisco Office, '02. Do. Los Angeles Office, '02 to date. *530 Herman W. Hellman Bldg., Los Angeles, Cal.*

THEODORE VLADEMIROFF, (Electrical). With Western Elec. Co. 2d Class Engr. U. S. S. Helena. *Chicago, Ill.*

CHARLES D. WEBSTER, (Mechanical). M. Eastern Man. Train. Ass'n. M. Mich. State Teachers' Ass'n. Machinist, Allis-Chalmers Co., Milwaukee, '97. Corporal, Co. C, 33rd Mich. Vol., '98. Instr., Bay City H. S., '99-'00. Do. U. S. Indian Service, '00-'01. Do. Man. Train., Bay City Public Schools, '01 to date.

ROY R. WILEY, (Electrical). E.E. (U. of Wis.). With Diamond Meter Co. *Peoria, Ill.*

WALTER H. WOODS, (Electrical). U. S. Postal Clerk, Ann Arbor P. O., '98-'00. Salesman, Kohler Bros., '00-'05. *1808 Fisher Bldg., Chicago, Ill.*

IRVING C. WOODWARD, (Mechanical). *Iron Mountain, Mich.*

1898.

CHARLES W. BAGGOTT, (Civil). With U. S. Scale Co., '98. *Terre Haute, Ind.*

BENJAMIN F. BAILEY, (Electrical). With Edison Co., Detroit. Genl. Electric Co. *Schenectady, N. Y.*

FREDERICK C. BARR, (Electrical). Genl. Elect. Co. *Schenectady, N. Y.*

FREDERICK P. BEACH, (Electrical). Testing Dept., Genl. Elect. Co., Schenectady, N. Y., '99-'01. A. C. Eng. Dept., do. Drafting Dept., on Power Houses, for Edison Elect. Co., Los Angeles, '03-'05. With Elect. Expert for Pacific Slope, U. S. Reclamation Service, Los Angeles Office, '05. *398 Pacific Elect. Bldg., Los Angeles, Cal.*

MURRAY BLANCHARD, (Civil). C.E. '03. Assoc. M. Am. Soc. C. E. Recorder, U. S. Deep Waterways Survey, '98-9. Do. U. S. Lake Survey, '99-'01. Junior Engr., U. S. Lake Survey, '01-5. *33 Campau Bldg., Detroit, Mich.*

FREDERICK K. BOOMHOWER, (Electrical). Constr. Engr., Waverly Lighting Co., H. E. O'Neil & Co., '98-9. Elect. Engr., Auburn Prison, New York, '99-'01. Chf. Engr., Treas. Dept., Bureau of Engraving and Printing, '01 to date. *717 10th N. W., Washington, D. C.*

FREDERICK C. BORST, (Mechanical). Mech. Dept. D. & R. G. R. R. *Denver, Colo.*

THOMAS A. BRAGG, (Mechanical). Erect. Engr., New Era Iron Wks. Co. *Dayton, O.*

IRVING J. BROWN, (Electrical). Dftsman, Brown Hoist. & Mach. Co. Do. Kilby Mfg. Co. *Cleveland, O.*

ROY W. BROWN, (Electrical and Mechanical). *Geneseo, Ill.*

JOHN W. BYERS, (Electrical). Student Harvard Univ., '98-9. *Cambridge, Mass.*

Charles O. Cook, (Mechanical and Electrical). Dftsman, Variety Iron Wks., '98. Do., Kilby Mfg. Co., Cleveland. Mich. Telephone Co. *30 Bagg St., Detroit, Mich.*

*Edward B. Coolidge, (Electrical). Student Mass. Inst. Tech., '98-9. Died in August, 1900, at Detroit, Mich.

Sollace B. Coolidge, (Electrical). Agt. Beaumont & Chauncy Coal Co. *43 E. Alexandrine Ave., Detroit, Mich.*

Leonard P. Coulter, (Electrical). Meter Insp., Diamond Meter Co., Peoria, Ill., '98-9. Dftsman, Cutler Hammer Mfg. Co., Milwaukee, '99-'01. Chf. Dftsman, do., '01-3. Elec. Engr., do., '03 to date. *673 28th St., Milwaukee, Wis.*

John S. Cowgill, (Electrical). M. Am. Inst. E. E. Dynamo and Motor Tester, Western Electric Co., '98-9. Constr. Engr., do., '99-'00. Dftsman, do., '00-'01. Designing Elec. Engr., do., '00-4. Chf. Elec. Engr., Fairbanks-Morse Co. (Three Rivers Elect. Co.), '04 to date. *522 Maple St., Three Rivers, Mich.*

Faust F. Crampton, (Electrical). Asst. Exam. Patent Office. *Washington, D. C.*

Henry W. Daniels, (Civil). Supt. of Schools, Newaygo, '98-'00. Do., St. Louis, '00-'05. *St. Louis, Mich.*

Isaac De Young, (Civil). M. Univ. of Mich. Eng. Soc. Instrumentman and Dftsman, C. C. C. & St. L. Ry., '98. Insp. M. L. S. P. Co., '98-9. Dftsman, Algoma Central Ry., '99. Insp. M. L. S. P. Co., '99-'01. Asst. Engr., do., '01. Junior Engr., U. S. Gov't., '01-5. *414 Dawson St., Sault Ste. Marie, Mich.*

Amos F. Everett, (Civil). U. S. Deep Waterways Survey, '98. *Lansing, Mich.*

Howard Felver, (Mechanical). Instr. Math. *Marinette, Wis.*

Robert M. Fox, (Civil). Computer, U. S. Deep Waterways Survey, '98. Asst. Engr., Maintenance of Way, D. G. R. & W. and C. & W. M. R. R's. (now Pere Marquette), '99-'01. Asst. Bridge Engr., M. C. R. R., '01 to date. *84 Prentis, Detroit, Mich.*

Frank A. Fucik, (Mechanical). Dftsman, Ill. Steel Co., Chicago, '98-9. Instr. Mech. Drawing, Chicago Public Schools, '99-'02. Instr. Mech. Drawing, R. T. Crane H. S., Chicago, '02-5. *731 So. Sawyer Ave., Chicago, Ill.*

Francis F. Gillen, (Civil). Recorder U. S. Deep Waterways Survey, '98. Insp. Mich. Lake Superior Power Co., '98. Engr. Asst. Dept. Bldgs. and Grounds. *Washington, D. C.*

Leon Goldsmith, (Electrical). M. Am. Soc. E. E.; M. N. A. S. E. With Chicago Edison Co., '98-9. With Southwark Fdy. & Machine Co., '99-'03. Salesman, Westinghouse Elec. & Mfg. Co., at present. *507 Westinghouse Bldg., Pittsburg, Pa.*

Ernest P. Goodrich, (Civil). '01 C.E. M. Am. Soc. C. E. M. Nat'l Geographical Soc. Structural Designer, Edison Elec. Co., Detroit, '98. Eng'g Asst., Dept. Public Bldgs. and Grounds, War Dept., Washington, D. C., '98-9. Civil Engr., (Lieut. J. G.)

U. S. Navy at New York Navy Yard, '99-'02. Chf. Engr., The Bush Co., Ltd., Bush Terminal Co., Bush Terminal Ry. Co., '02 to date. Consulting Engr., firms in New York City, New Orleans, Detroit, Cleveland, St. Louis, Philippine Islands, Valparaiso, Chili., '04 to date. *167 Clinton Ave., Brooklyn, N. Y.*

Fred M. Green, (Mechanical). Assoc. Mem. Am. Soc. C. E. Dftsman, Detroit Heat. & Ventil. Co., '91-2. Do. Elect. Wks., '93. Do. Frontier Iron Wks. Do. Russel Wheel & F'dry Co., '95-6. Insp., Mich. Lake Superior Power Co., '98-9. U. S. Asst. Engr., Office of Public Bldgs. and Grounds, Washington, D. C., '00. Instr. in Civil Eng., U. of M., '00-'02. Structural Dftsman, Cambria Steel Co., '02-3. Dftsman, P. N. Y. & L. I. R. R. Co., '03-4. Office Engr., do., '04-5. *1 West 34th St., New York, N. Y.*

Harry E. Harrington, (Electrical). Cable Testing Dept., Western Elect. Co., Chicago, '98-9. Equipment Dept., Chicago Telephone Co., '99. Equipment Dept., Mich. Telephone Co., Grand Rapids, '00-2. Local Traffic Mngr., do., '02-4. District Switchboard Insp., do., '04-5. *57 Lake Ave., Grand Rapids, Mich.*

Archie L. Harris, (Civil). Dftsman, U. S. Deep Waterways Survey. Do. N. Y. State Barge Canal Survey, Albany, '00-'01. Do. U. S. Isthmian Canal Com'n, Washington, D. C., '01. Do. Russel Wheel & F'dry Co., Detroit, '01-2. Do. Penn. R. R., New York, '02-3. Asst. Engr., U. S. Reclamation Service, Arizona, '03-5. *Roosevelt, Arizona.*

Le Roy M. Harvey, (Electrical). Teleg. Dept. C. & N. W. Ry., '98. Testing Dept. Westinghouse Mfg. Co., '99. *Pittsburg, Pa.*

Percy M. Holdsworth, (Mechanical). Testing Dept. Fairbanks, Morse & Co. Motive Power Dept. Atl. Coast Line R. R. *Wilmington, N. C.*

Edward P. Marsh, (Mechanical). M. Western R. R. Club. Insp. New Equipment, C. & N. W. Ry., four years. Foreman Pass. Shop, do., two years. *303 Kenilworth Ave., Oak Park, Ill.*

William J. Marsh, (Electrical). *Pittsford, N. Y.*

Howard B. Merrick, (Civil). Masonry Insp., G. N. Ry., '98. Leveler, do., '98. Asst. Engr., do., '98-'02. Supt. of Drills, E. J. Longyear & Co., '02-3. Instr. in Surveying, U. of M., '03 to date. *928 Church Street, Ann Arbor, Mich.*

Herbert A. Moody, (Mechanical). Junior Mem. Soc. M. E. Dftsman, Morton Mfg. Co., Muskegon, '98-9. Do. Central Paper Co., Muskegon, '99-'00. Engr. on Const., Union Bag & Paper Co., Sandy Hill, N. Y., '00-'04. Resident Engr., Cherry River Paper Co., Richwood, W. Va., '04-5. Mem. of Eng. firm, Fairbanks & Moody, 150 Nassau St., New York City, '05 to date. *Richwood, W. Va.*

Fred W. Newell, A.M. (Bates), (Electrical). With Elwell-Parker Elect. Co., '98 to date. *Cleveland, O.*

CLAUDE G. NEWTON, (Civil). U. S. Deep Waterways Survey, '98. Dftsman, Genl. Elec. Co. Do. Milwaukee Bdge. Wks.
Milwaukee, Wis.

*JOSEPH H. PETTERSCH, (Mechanical). Dftsman, Gates Iron Wks., '98. Do. Fraser & Chalmers, '98-9. Died ....

OTTO PRUESSMAN, (Electrical). Telephone Eng., Western Elect. Co., '98 to date. *1621 Aldine Ave., Chicago, Ill.*

EDWARD H. RAVENSCROFT, (Civil). With R. Modjeski, Cons. Engr., '98 to date. *Chicago, Ill.*

CLARENCE W. RAYNOR, (Civil). Dftsman and Asst. Engr., B. R. & P. Ry., '98 to date. *Rochester, N. Y.*

HERBERT L. RUSSELL, (Civil). Dfting, Wirner's Patent Office, '98-9. Asst. Engr., Grand Trunk Ry., '99-'04. Engr. in charge of Construction, Central Heating Co., '04 to date.
233 Canfield Ave., W., Detroit, Mich.

JAMES T. ST. CLAIR, (Electrical). B.S., M.E. '99. Junior, Am. Soc. Mech. Eng. Dftsman, Am. Car & F'dry Co., Detroit, '99-'02. Chf. Dftsman, do., '02 to date.
225 Vinewood Ave., Detroit, Mich.

FRANK N. SAVAGE, (Civil). With Chicago Edison Co. Grad. Student U. of M., '98-9. *Ann Arbor, Mich.*

LLOYD B. SMITH, (Civil). U. S. Deep Waterways Survey. Dftsman, Paige Iron Wks. Do. Mo. Valley Bdge. Wks.
Leavenworth, Kan.

CLARENCE W. SQUIER, (Electrical). Elect'n, G. W. Jones Elect. Co., Elwell-Parker Elect. Co. Dftsman, E. H. Dyer & Co.
Cleveland, O.

ROBERT STECK, (Electrical). M. Am. Inst. E. E. Asst. to C. A. Pratt, Cons. Engr., '98-9. Eng. Dept. Western Elec. Co., '99-'00. Asst. Supt., Fire Extinguisher Mfg. Co., '00-'01. Eng. Dept. Western Elec. Co., '01 to date.
1520 Wolfram St., Chicago, Ill.

JOHN F. STREIB, (Civil). Rodman and Recorder, U. S. Deep Waterways Com., '98-9. Dftsman, Gen'l Elect. Co., '99. Do. Pressed Steel Car Co., '99-'00. Checker, do., '00-'02. Chf. Dftsman, do., '02-3. Mech. Engr., do., '03 to date.
719 Taylor Ave., Avalon, Pa.

CLAUDIUS H. THOMAS, (Mechanical). Dftsman, Roe Stephens Mfg. Co., Detroit, Mich., '98-'03. Sec'y and Treas., Gilbert Wilkes & Co., Denver, Colo., '03-5. *435 17th St., Denver, Colo.*

HOWARD P. TREADWAY, (Civil). Assoc. Mem. Am. Soc. C. E. Asst. Surveyor, Old Dominion Copper Min. and Smelting Co., Globe, Ariz., '98-9. Contr. Engr., Wrought Iron Bdge. Co., Kansas City, Mo., and Omaha, Nebr., '99-'01. Do. Am. Bdge. Co., '01-2. Vice-Pres't and Contr. Engr., Kansas City Bdge Co., '02 to date. *1109 McGee St., Kansas City, Mo.*

Sutton Van Pelt, (Civil). Assoc. Mem. Am. Soc. C. E. M., W. S. E. Stadiaman, U. S. Deep Waterways Survey, '98. Insp., Mich. Lake Superior Power Co., '98-'01. Insp. and Jun. Engr., U. S. Eng. Dept., Alabama, '01 to date. *Tuscaloosa, Ala.*

Albert A. Weber, (Mechanical). Student in Medicine, U. of M. *Ann Arbor, Mich.*

Morey A. Wood, (Mechanical). Instr. Math. *Burlington, Ia.*

Fay Woodmansee, (Electrical). M. Am. Inst. of E. E. Dftsman, Gen'l Elect. Co., Schenectady, N. Y., '99-00. Engr., do., '00-'03. Elec. Engr., Sargent E. Lundy. Engr., 1720 Ry. Exchange, Chicago, '03 to date. *430 S. 18th Ave., Maywood, Ill.*

1899

Emanuel Anderson, (Mechanical). Dftsman, J. S. Metcalf Co., Chicago, '99. With Sargent & Lundy, engrs., '00.. *Chicago, Ill.*

James C. Armstrong, (Electrical and Mechanical). With Alaska Explor. Co. *Nome City.*

Frederic E. Arnold, (Mechanical). Dftsman, Whiting F'dry Equipment Co., '99-'01. Salesman, do., '01-5. *528 E. 6th South St., Salt Lake City, Utah.*

Norwood B. Ayers, (Electrical). Asst. Master Mech., Cudahy Packing Co. *Kansas City, Mo.*

William P. Baker, (Electrical). Erect. Dept. Gates & Randolph, Chicago. Dftsman. Genl. Elect. Co. *Schenectady, N. Y.*

John W. F. Bennett, (Civil). Instrumentman, Lake St. L. Road Extension, Chicago, '99. Timekeeper, Asst. Supt. and Supt. of Constr., Thompson-Starrett Co., New York and Phila.. '99-'04. Constr. Engr., Waring-White Bldg. Co., London, England, '04 to date. *25 Dorce St., Piccadilly, London W., England.*

James R. Bibbins, (Electrical). Assoc. Am. Inst. E. E. Jun. Am. Soc. Mech. E. Past Member Detroit Eng. Soc. Dftsman, Detroit Edison Co., '99. Operating Electrician, Public Light. Com'n, Detroit, '00. Asst. Engr., Detroit Edison Co., '01. Asst. Elec. Engr., Detroit United Rys., '02. Technical Writer, Westinghouse Co. With Westinghouse Machine Co. at present. *224 East End Ave., Pittsburg, Pa.*

Joseph A. Bursley, (Mechanical). Special Apprentice, Pennsylvania Co., '99-'02. Instr. in Mech. Eng., U. of M., '04 to date. *1224 Washtenaw Ave., Ann Arbor, Mich.*

David F. Castilla, (Mechanical). Dftsman, with Foundry Co. *Monterey, Mex.*

William G. Chesebrough, (Mechanical). Dftsman, Northern Eng'n Wks., '99-'02. Salesman, Brown & Tortman Mach. Co., Pittsburg, Pa., '02-4. Sales Engr., Northern Eng'g Wks., '04 to date. *165 Lincoln Ave., Detroit, Mich.*

James W. Clift, (Mechanical). Dftsman, F. & P. M. R. R., Saginaw, '99-'00. Do. Wickes Bros., Saginaw, '00. Do. Industrial Wks., Bay City, '00-'01. Do. Am. Loco. Wks., Dunkirk, N. Y., '01-'02. Asst. Examiner, Patent Office, Washington, D. C., '02 to date. *1434 Chapin St., Washington, D. C.*

E. Warren Conable, (Civil). City Collector, Barnhart Bros. & Spindler, Typefounders, '99-'02. Asst. Creditman, do., '02-4. Office Mngr., do., '04 to date. Director, do., '04 to date.
185 Monroe St., Chicago, Ill.

William M. Cooper, (Mechanical). With Sterling Boiler Co., Barberton, O. Lumber Business. *Saginaw, Mich.*

Walter T. Curtis, (Civil). Active Member Western Soc. of Engrs. Dftsman, Wisconsin Bdge. & Iron Co., '99. Asst. Engr., C. & N. W. Ry. (Bdge. Dept.), '00. Checker, Am. Bdge Co., Pittsburg, '00. Chf. Dftsman, C. & N. W. Ry. (Bdge. Dept.), '01-3. Mngr. of Construction, Jos. T. Ryerson & Son, Chicago, '03. Chf. Dftsman, Wisconsin Bdge. & Iron Co., '04 to date.
North Milwaukee, Wis.

Burt J. Denman, (Electrical). M. Toledo Soc. of Engrs. Chf. Electrician, Toledo & Maumee Valley Ry., '95-9. Instr., Toledo Univ., '99-'00. Consulting Elect. and Mech. Engr., Clark & Denman, '00-'02. Elect. Engr., Toledo, Bowling Green & Southern Traction Co., '02-4. Elect. Engr. with Edison Illuminating Co., '04 to date. *1291 Fourteenth Ave., Detroit, Mich.*

Bartlett C. Dickinson, (Civil). Timekeeper, Geo. A. Fuller Co., '99-'00. Material Clerk, Thompson-Starrett Co., '00-01. Supt., do., '01-3. Gen'l Supt., do., '03-4. Vice-Pres't and Treas., Bottsford, Dickinson Co., '04 to date.
49 W. 24th St., New York, N. Y.

John H. Dressel, (Electrical). Assoc. Member Am. Inst. E. E. Checker on Drawings, Gen'l Elect. Co., '99-'01. Engr., Wagner E. & M. Co., '01-2. Engr., Westinghouse E. & M. Co., '02-4. Partner, Maphet & Dressel, '04 to date.
605 Commercial Tribune Bldg., Cincinnati, O.

George H. Gibson, (Electrical). M. Am. Inst. of E. E. M. Am. Soc. Mech. Engrs. Apprentice, Westinghouse Elec. & Mfg. Co., '99. Asst. Editor, *Engineering News*, '99-'01. Editor, Westinghouse Co.'s Pub. Dept., '01-3. Mngr. Dept. of Publicity, Internat'l Steam Pump Co., '03 to date.
628 West 148th St., New York, N. Y.

Harmon A. Harris, (Electrical). Engr., Ill. Telephone Construction Co., '99-'01. Mngr. Purchasing Dept., Automatic Electric Co., '01-2. Asst. Gen'l Mngr., do., '02 to date.
4914 Washington Park Place, Chicago, Ill.

Sanford F. Harris, (Electrical). Private Sec'y to the Pres't, Ill. Tunnel Co., '99-'05. Mngr. Chicago Office, J. B. Russell & Co. (Bankers, N. Y.), '05 to date.
311 Rookery Bldg., Chicago, Ill.

MILTON C. HARTMAN, (Electrical). Machine Dept. Siemens & Halske Elect. Co. Dynamo Testing, Western Elect. Co., Eng'g Dept. Edison Co. *Chicago, Ill.*

ORRA E. HEFFELBOWER, (Civil). U. S. Engr. Office. *Sault Ste. Marie, Mich.*

CLINTON J. HIXSON, (Electrical). Dftsman, Checker, Testing Dept., Asst. Engr., Genl. Elect. Co. *Schenectady, N. Y.*

FREDERICK R. HOOVER, (Civil). Contracting Engr., Wrought Iron Bdge. Co., '99-'01. Do. Am. Bdge Co., '01-2. Do. Canton Bdge. Co., '02 to date. *514 New York Life Bldg., Kansas City, Mo.*

JAMES L. HORTH, (Mechanical). Foundry Clerk, U. S. Heater Co., '99-'00. Dftsman, Am. Bdge. Co., Detroit Plant, '00-'05. *1217 Lafayette Ave., Detroit, Mich.*

LEWIS G. HOWLETT, (Electrical). B.S., M.E. '01. M. Am. Soc. Mech. Engrs. Asst. Chf. Dftsman., Industrial Wks., '99-'01. Asst. Supt., do., '01-5. *221 N. Van Buren St., Bay City, Mich.*

EDWIN A. HUGHES, (Electrical). Telep. Dept. Western Elect. Co. *Elkhart, Ind.*

WILLIAM L. KIMMEL, (Electrical). Elect. Engr., Grangeville Elect. Light & Power Co., '99-'02. Do., Wise Boy Min. & Mill. Co., '02-3. Consulting Engr. and Elect. Contractor, Nixon & Kimmel, '03 to date. *603 Sprague Ave., Spokane, Wash.*

CHARLES A. LA FEVER, (Electrical). M. Am. Inst. E. E. Asst. Supt., Advance Thresher Co., '99 to date. Board of Public Wks., City of Battle Creek, '00-'07. *75 Garrison Ave., Battle Creek, Mich.*

ERNEST LUNN, (Electrical). With Detroit Edison Co., '99-'02. Supt. of Storage Batteries, Chicago Edison Co., '02 to date. *139 Adams St., Chicago, Ill.*

WILLIAM M. MCKEE, (Electrical). Testing Dept. Western Electric Co., '99. Construction Work, U. S. Com'n to Paris Exposition, '99-'00. Construction Work, Mather & Platt, Ltd., Manchester, England, '01. Elect. Mining Engr., Pittsburg Coal Co., '04. Elect. Mining Engr., Jeffrey Mfg. Co., Columbus, O.. to present date. *Coal Exchange Bldg., Wilkesbarre, Pa.*

*AUGUSTUS J. MAYWORM, (Mechanical). Asst. Engr., Fletcher Paper Co. Do. Alpena Portland Cement Co. Died at Alpena, Mich., in July, '01.

WILLIAM L. MIGGETT, (Mechanical). M.E. '04. M. Am. Soc. M. E. M. Am. Soc. for Promotion of Eng'g Education. Supt. Eng'g Shop, U. of M., for six years. *432 Hamilton Place, Ann Arbor, Mich.*

JOHN T. MOUNTAIN, (Electrical). Statistician, Chicago Edison Co. *Chicago, Ill.*

CLARENCE W. NOBLE, (Civil). U. S. Coast and Geod. Survey, '99. Dftsman, McClintic-Marshall Const. Co. Engr., Rudolf Mark-

graf Factory. Arch't, '03-4. Engr. in charge of Reinforced Concrete Dept. (Builders'), Material Supply Co., to date. Member of firm of Dousman & Noble, Consulting Engrs.
405 Brooklyn Ave., Kansas City, Mo.

ARD E. RICHARDSON, (Electrical, Mechanical, '00). Electrician, Wickes Bros., '00. Elect. and Steam Testing, Field & Hinchman, '01. Elect., Detroit United Ry. Co., '01. Do. Saginaw Valley Traction Co., '02. Gen'l Engr., do., '03.
402 N. Jefferson Ave., Saginaw, Mich.

WELLINGTON ROBERTS, (Civil). With Isthmian Canal Com'n. Asst. Engr., Algomah Cent. R. R. *Sault Ste. Marie.*

DAVID N. ROSEN, (Mechanical). Shop and Erecting and Draughting, E. P. Ellis Co., Milwaukee, '99-'02. Supt. Construction of Power Plants, Sargent & Lundy, Chicago, '02-5. In charge of Erection Dept., Stirling Boiler Co., six weeks.
C/o Barberton Inn, Barberton, Ohio.

ARTHUR G. ST. JOHN, (Civil). Dftsman, General Electric Co., Schenectady, '99. Locating Engr., E. H. Christ, Grand Rapids, Mich., '99-'00. Dftsman, Riter-Conley Mfg. Co., Pittsburg, '00. Do. Heyl & Patterson, Pittsburg, '00-'01. Do. Wisconsin Bdge. & Iron Co., N. Milwaukee, Wis., '01. Estimator, Grace & Hyde, Chicago, '01-2. Estimator and Chf. Dftsman, Warren R. Roberts, Chicago, '02-4. Member of firm, The St. John Eng. Co., Chicago, '04 to date.
1749 Railway Exchange Bldg., Chicago, Ill.

CARY D. TERRELL, (Electrical). Junior Am. Soc. Mech. Engrs. M. Western Ry. Club. Pittsburg Ry. Club. Special Apprentice, Ill. Central R. R., Chicago, '99-'01. Assoc. Editor, *Ry. and Engineering Review*, Chicago, '01-4. Asst. to President, Kentwood & Eastern R. R., Chicago, '02-3. Asst. Road Foreman of Engines, A. T. & S. F. Ry., Lines west of Albuquerque, Los Angeles, Cal., '04-5. Sales Agt., Pressed Steel Car Co., Pittsburg, '05 to date. *1914 Farmer's Bank Bldg., Pittsburg, Pa.*

FRANK TROTT, (Mechanical). Testing Engines, Fairbanks, Morse & Co., '99. Statistician, Chicago Edison Co., '99-'00. Dfting, Estimator and Salesman, Whiting Foundry Equip. Co., '00-'05. Asst. Engr. of Construction, Amer. Steel Foundries, '05.
2413 3rd St., Chester, Pa.

CHARLES H. WEIDEMAN, (Mechanical). Dftsman, S. V. Huber & Co. Do. Amer. Steel Hoop Co. Do. Sharon Steel Co.
Sharon, Pa.

WILLIAM R. WEIDMAN, (Mechanical). Dftsman, Amer. Bdge. Wks. Do. Scherzer Rolling Lift Bdge. Co. *Chicago, Ill.*

CLARENCE W. WHITNEY, (Mechanical). Assoc. Editor, *Western Electrician*, Chicago, '99-'03. Pacific Coast Representative, McGraw Publishing Co. (headquarters in San Francisco), '03-4. Mngr. Publicity Dept., Abner Doble Co., San Francisco, '04 to date. *2630 Haste St., Berkeley, Cal.*

BERTRAM D. WILBER, (Electrical). Testing, West. Elect. Co., '99. Asst. Div. Inspector, Cent'l Union Telep. Co., '00. *Peoria, Ill.*

*ARTHUR B. WOOD, (Electrical). Dftsman, Asst. Elect. Engr., Eddy Motor Co. Died in Albany, N. Y., in April, '01.

1900

MARK B. BEATTIE, (Electrical). Asst. Appraiser Elect. Dept., Mich. State Tax Com. Production Dept., Western Electric Co. Sales Dept., General Electric Co. *1434 Majestic Bldg., Detroit, Mich.*

ELIAS H. BECKSTRAND, (Electrical). M. M. E. (Cornell) '01. Assoc. Mem. Am. Inst. E. E. M. Sigma Xi Soc. Prof. of Mech. Eng'g., Univ. of Utah, '01-5. *Salt Lake City, Utah.*

CLAUDE K. BENTLEY, (Mechanical). Dftsman, Northern Eng. Wks., '00. Do. Whiting F'dry. Equip. Co., '00-'02. Estimator, do., '02-5. *15440 Turlington St., Harvey, Ill.*

FREDERIC A. BERGBOM, (Mechanical). Dftsman, Gates Iron Wks. *Chicago, Ill.*

FREDERICK N. BRADLEY, (Civil). With Bridge Dept., C. & N. W. Ry., '00-'01. With Ill. Steel Co., '01-2. Asst. Engr., Bridge Dept., C. & N. W. Ry., '02-3. Asst. Shf. Dftsman, Ill. Steel Co., '03-4. With Ralph Modjeski, Consulting Engr., '04-5. With Hoover & Mason, Contracting Engrs., '05 to date. *1258 Perry St., Chicago, Ill.*

JOSEPH W. BUSCH, (Electrical). *Marquette, Mich.*

PAUL CHEEVER, (Mechanical). Assoc. Member Am. Inst. E. E. With Field & Hinchman, '00-'03. Dftsman, Chicago Edison Co., '03. Asst. to Elect. Engr., Ontario Power Co., '03 to date. *Niagara Falls Centre, Ontario.*

CARL C. CLEVERDON, (Mechanical). Dftsman, Pearson Machine Co. *Chicago, Ill.*

JENARO DAVILA, (Civil). Mex. Technical & Financial Co. *Monterey, Mex.*

HARRY H. DICKINSON, (Electrical). With J. A. Erner & Co. *Columbus, O.*

PAUL A. DRATZ, (Mechanical). City Elect'n, Escanaba. With Field & Hinchman, Detroit. With J. A. Erner & Co. *Columbus, O.*

DAVID G. FISHER, (Civil). M. Western Gas Assoc. Dftsman, Toledo Bridge Co., and American Bridge Co., '00-'02. Supt., Briggs Real Estate Co., '02-3. Supt., Station "B," Laclede Gas Light Co., '03 to date. *C/o Laclede Gas Light Co., St. Louis, Mo.*

ANDREW GRABENSTEIN, (Civil). *Lake Linden, Mich*

HARRY D. HARTING, (Civil). Jr. Engr., U. S. Gov't, '00-'04. Hydrographic Surveyor, Navy Dept., U. S., '04 to date. *Guantanamo Naval Station, Cuba.*

ERNEST H. JACOBS, (Electrical). Engr. switchboard apparatus and switchboards, General Electric Co., '00-'05.
338 McClellan St., Schenectady, N. Y.

LEE F. JOHNSTON, B.S. Purdue, (Civil). U. S. Engr. Office.
Sault Ste. Marie, Mich.

OSCAR G. JOSEPH, (Civil). Designer, Mount Vernon Bdge. Wks., '00-'01. Dftsman, Am. Bdge. Co., Toledo, '01-3. Asst. Engr., L. & N. R. R. Co., '03 to date.
1601 First St., Louisville, Ky.

ALFRED H. KNIGHT, (Mechanical). M. M. E. (Cornell), '01. Dftsman, Eastern Shipbuilding Co., '01-2. Do. New York Shipbuilding Co., '02-3. Asst. Chf. Dftsman, Hull Dept., Great Lakes Eng. Works, '03-5. *314 Vinewood Ave., Detroit, Mich.*

OTTO A. KRAUSE, (Mechanical). Hirth, Krause & Co.
Grand Rapids, Mich.

ROBERT E. KREMERS, A.B. Hope College, (Civil). Dftsman, City Engr. Office. *Salt Lake City, Utah.*

WILLIAM LENHARTZ, (Mechanical). A.M. '01. M. "Verein deutscher Ingenieure." Dftsman, Allis Chalmers Co., '01-3. Do. Bucyrus Co., '04. Asst. to Supt., do., '04 to date.
553 Jackson St., Milwaukee, Wis.

ORA M. LELAND, (Civil). Assoc. Member Am. Soc. C. E. Member Am. Assoc. for the Advancement of Science. Membre Societe Belge d' Astronomie. Chf. Clerk and Dftsman, Office of U. S. Surveyor General of Florida, '98-9. Clerk (Division of Surveys), U. S. General Land Office, '00. Aid, U. S. Coast and Geodetic Survey, '00-2. Computer, do., '02-3. Clerk (Division of Surveys), U. S. General Land Office, '03. Instr. in Civil Eng., Cornell Univ., '03 to date. Surveyor to the U. S. Commissioner for the Demarkation of the Boundary between Alaska and Canada, '04 to date. *127 Cascadilla Place, Ithaca, N. Y.*

ALFRED E. LINDAU, (Mechanical). M. Western Soc. of Engrs. With Mich. Tax Commission, '00-'01. Dftsman, Whiting F'dry Equip. Co., '01. Do. Wisconsin Bdge. & Iron Co., '01. Do Bdge. Dept. C. B. & Q. Ry., '01-3. Asst. Engr., Bdge Dept. C. R. I. & P. Ry., '03-5. Asst. Engr., St. Louis Expanded Metal Fire-Proofing Co., '05 to date. *606 Century Bldg., St. Louis, Mo.*

CHESTER B. LOOMIS, (Mechanical). With Western Elect. Co. Dftsman, Brooks Locomotive Wks. *Dunkirk, N. Y.*

FREDERICK H. LOUD, (Civil). *Au Sable, Mich.*

GUY W. LUNN, Engr., Mich. Telephone Co., '00-2. Engr., Chicago Edison Co., '02 to date. *139 Adams St., Chicago, Ill.*

ROYAL J. MANSFIELD, (Civil). C.E. '02. Jun., Am. Soc. C. E. Aid, U. S. Coast Survey, '98-9. Dftsman, Cambria Steel Co., '00-'01. Do. Riter-Conley Mfg. Co., '01-2. Asst. Engr., do., '02-4. Asst. Engr., chg. buildings, Wellman Seaver Morgan Co., '04-5.
83 Arlington St., Cleveland, O.

Harry S. Marsh, (Electrical). Asst. Elect. Engr., Pittsburg Plate Glass Co. *Fort City, Pa.*

Shigeru Matsuyama, (Mechanical). With Cornell Machine Co., Chicago. *Tokio, Japan.*

Walter B. Maurice, (Civil). M. Detroit Eng. Soc. Insp., Mich. State Tax Com'n, '00-'01. Dftsman, Am. Bridge Co., '01-3. Do. Detroit Water Board (Civil Eng. Dept.), '03 to date.

Henry A. McLean, (Mechanical). *Mayfair, Ont.*

Ezra B. Mead, (Mechanical). Ed. Dept., *Construction News.* *Chicago, Ill.*

William C. Miller, (Electrical). With Edison Ill'g Co. *Detroit, Mich.*

Frederick N. Nelles, (Civil). Dftsman, Cambria Steel Co. *Johnstown, Pa.*

Arthur W. Norton, (Mechanical). With Norton Bros. *Chicago, Ill.*

Floyd J. Page, (Mechanical). Dftsman, Brown Hoist. Mach. Co., '00-'01. Do. Northern Eng. Wks., '01. Dftsman and Checker, Whiting F'dry Equip. Co., '01-'05. Dftsman, Link Belt Mach. Co., '05 to date. *15607 Lexington Ave., Harvey, Ill.*

Clarence J. Rannells, (Civil). With Cambria Steel Co. *Johnstown, Pa.*

Anton S. Rosing, (Civil). M. Western Soc. of Engrs. Rodman, Chicago & Northwestern Ry., '00-'02. Instrumentman, do., '02-5. Resident Engr., Chicago Southern Ry., '05 to date. *Crete, Ill.*

Richard W. Runge, (Mechanical). B.S., E.E. '01. Testing Gasoline Engines, Fairbanks, Morse & Co., Beloit, Wis., 10 months. Dftsman, do., 8 months. Dftsman and Checker, The Shaw Electric Crane Co., Muskegon, Mich., 1 year. Dftsman and Insp., C. & N. W. Ry. Co., Chicago, Ill., 14 months. Dftsman, Bucyrus Co., S. Milwaukee, Wis., 8 months. *905 Michigan St., S. Milwaukee, Wis.*

Harry M. Sedgwick, (Mechanical). Sec'y and Treas., S. Wilks Mfg. Co., '00 to date. *4524 Ellis Ave., Chicago, Ill.*

Alva F. Traver, (Mechanical). M. Mich. Gas Ass'n. M. Ohio Gas Ass'n. M. Western Gas Ass'n. Dftsman, Grand Rapids Gas Light Co., '02. Asst. Supt., do., '02-3. Supt., do., '03 to date. *273 Lagrave St., Grand Rapids, Mich.*

Joseph J. Walser, (Civil). Purchasing Agt. and Asst. Supt., The Goss Printing Press Co., Chicago, '00 to date. *417 S. Central Ave., Austin, Chicago, Ill.*

Charles M. Waters, (Civil). Insp., U. S., Ill. & Miss. Canal, '00-'02. Topographer, U. S., Ill. River Survey, '02-3. In charge of section of Ill. & Miss. Canal, '03-5. *Geneseo, Ill.*

Frederick J. Wilbur, (Civil). Rodman and Inspector, N. Y. C. & H. R. R. R. *Rochester, N. Y.*

Joseph W. Wood, (Electrical). Sec'y and Treas., Freeland Mfg. Co. *Main St., Niles, Mich.*

GEORGE D. WUERFEL, (Mechanical). Mech. Engr., Toledo F'dry & Mach. Co., '00 to date. *811 Erie St., Toledo, O.*
JACOB G. YOUNG, (Civil). M. Western Soc. of Engrs. Chf. Dftsman, Chicago Bridge & Iron Wks., '95-'00.

1901

LESLIE D. ANDERSON, (Mechanical). *Milwaukee, Wis.*
EMILIO ARIZPE, (Mechanical). Active member of U. of M. Eng. Soc. for four consecutive years. Asst. Engr. to Prof. John R. Allen, in the Mackinac Island Works, '01. Insp. of Constr. at Mich. School of Mines, Charlton & Gilbert, Archts., Houghton, '01-'02. Dftsman for Field, Hinchman & Smith, Detroit, '02-3. Asst. Engr., in charge of tunnels and canals, Mexican Light & Power Co., Ltd., Necaxa, Pa. Mexico, '03-'04. *Saltillo, Coahuila, Mexico.*
WAREHAM S. BALDWIN, (Chemical). *Grand Rapids, Mich.*
EDWARD L. BENEDICT, (Mechanical). *Cleveland, O.*
HUBERT W. CARPENTER, (Mechanical). *Harvey, Ill.*
WASHINGTON H. CHAPMAN, (Mechanical). *Ypsilanti, Mich.*
CLARENCE HOWARD CLARK, (Mechanical). M. Detroit Eng. Soc. Dftsman, Russel Wheel & Foundry Co., '01-2. Erector, Detroit United Ry., '02-3. Chf. Dftsman, Lloyd Construction Co., '03 to date. *206 Stanley Ave., Detroit, Mich.*
STEPHEN P. CÓBB, (Civil). M. Eng. Soc. of Western Penn. M. Western Gas Ass'n. Dftsman, Am. Bdge. Co., '01-3. Engr., Elliott & Baton, Pittsburg, '03-4. Asst. in charge of Water Gas Dept., Station A, Laclede Gas Light Co., '04-5. Construction Insp. Gas Dept., Rochester Railway & Light Co., '05 to date. *C/o Rochester Railway & Light Co., Rochester, N. Y.*
CHARLES B. DAVIS, (Civil). *Ann Arbor, Mich.*
GUSTAV B. EGGERT, (Mechanical). *823 Willson Ave., Cleveland, O.*
LEWIS M. GRAM, (Civil). *Toledo, O.*
GUY P. HENRY, (Mechanical). Dftsman, Brown Hoist. Co., Cleveland, '01. Do. Russel Wheel & Foundry Co., Detroit, '01-'02. Do. Am. Bridge Co., Detroit, '02-3. Do. Garry Iron & Steel Co., Cleveland, '03. Establishing a cost system and general Mechanical Engineering, Chi. Portland Cement Co., LaSalle, Ill., '03-4. Dftsman, Am. Bridge Co., Detroit, '04 to date. *177 Trumbull Ave., Detroit, Mich.*
GEORGE S. HILL, Dftsman, Am. Bdge. Co., Toledo, '01-3. Designer, Scherzer Rolling Lift Bdge. Co., '00-4. Checker, Wisconsin Bdge. & Iron Co., '04. Asst. Engr., Scherzer Rolling Lift Bdge. Co., '04 to date. *3038 Groveland Ave., Chicago, Ill.*
ALPHEUS E. HOLCOMB, (Mechanical). Junior Member Am. Soc. of M. E.; full member of Am. Foundrymen's Ass'n. Dftsman, Industrial Wks., Bay City, '01-2. Asst. Chf. Dftsman, do., '02-5. Asst. Chf. Engr., do., '05 to date. *1608 9th St., Bay City, Mich.*
WILLIAM C. HORNBERGER (Mechanical). *Detroit, Mich.*

Raymond Fuller Horton, (Civil). *753 Campbell Ave., Detroit, Mich.*

George D. Hudnutt, (Mechanical). Dftsman, Studebaker Bros. Mfg. Co., So. Bend, Ind., '01-2. Do., Otis Elevator Co., Yonkers, N. Y., '02-4. Asst. Chf. Dftsman, Otis Elevator Co., Chicago, '04 to date. *1055 Sheridan Road, Chicago, Ill.*

Edgar W. Kiefer, (Mechanical). Dftsman, Detroit Shipbuilding Co., '01-3. Mech. Engr., Mich. Sulphite Fibre Co., '03-5. *Port Huron, Mich.*

William W. Kittleman, (Electrical). *616 14th Ave., Detroit, Mich.*

Frederick E. Leefe, (Civil). *Sault Ste. Marie, Mich.*

Charles Gillett Leeson, (Mechanical). *Manchester, Mich.*

Bernard H. Liskow, (Mechanical). *291 Greenbush St., Milwaukee, Wis.*

Thomas L. B. Lyster, (Electrical). M. M. E. (Cornell), '03. Assoc., Am. Inst. of E. E. Asst. Insp. of Dredging, U. S. Gov't., '01. Testing Dept., General Electric Co., '01-2. Graduate Student, Cornell Univ., '02-3. Construction Dept., Fort Wayne Electric Wks., '03. Asst. Engr., Westinghouse, Church, Kerr & Co., '03 to date. *C/o Westinghouse, Church, Kerr & Co., 10 Bridge St., New York, N. Y.*

Andrew H. McDougall, (Mechanical). Dftsman, Studebaker Bros. Mfg. Co., South Bend, Ind., '01-3. Do., Whiting Foundry Equip. Co., Harvey, Ill., '03-4. Estimator, do., '04 to date. *15242 Lexington Ave., Harvey, Ill.*

Walter MacGregor, (Mechanical). M.E., '03. Foreman Mach. Shop, Detroit Plant, American Radiator Co., '01. Dftsman, Whiting Foundry Equip. Co., Harvey, Ill., '02-3. Dftsman, American Steel Foundries, '03-4. Constr. Engr., do., '04-5. *228 East 4th St., Chester, Pa.*

George D. McNaughton, (Civil). Insp., Ralph Modjeski, Cons. Engr., '01-4. Do., Hildreth & Co., Cons. Engr., '04. Do., Pittsburgh Testing Laboratory, '04. Estimating Engr., Levering & Garriques Co., '05. *350 West 22nd St., New York, N. Y.*

Ralph M. Myers, (Mechanical). Asst. Professor of Eng. in Univ. of So. Dakota. *Muir, Mich.*

Alfred L. Newton, (Civil). C.E., '04. Sec'y and Treas. Newton Engineering Co., '02 to date. *424 Jackson St., Milwaukee, Wis.*

John C. Parker, (Mechanical). A.M., '02. E.E., '04. Assoc. Member Am. Inst. of E. E. Junior, Am. Soc. of C. E. Electrical Tester, General Electric Co., '02-3. Instr. in E. E. and M. E., Union Univ., '03-4. Asst. Engr. in charge Ontario Power Co., '04 to date. *244 Fifth St., Niagara Falls, N. Y.*

Arthur H. Richardson, (Mechanical). With the Western Electric Co., '01 to date. *4059 Prairie Ave., Chicago, Ill.*

Eugene A. Rummler, (Mechanical). M. Western Soc. of Engrs.; M. Patent Law Ass'n. Dftsman, Detroit Dry Dock Co., '98-9. Dftsman in charge of construction, Crescent Ship Yds., Elizabeth, N.J., '99-'01. Mechanical Expert and Solicitor of Patents, Member of firm, Rummler & Rummler, Patent Attorneys, Chicago, '01 to date. *1400-143 Dearborn St., Chicago, Ill.*

Louis E. Seas, (Civil). Dftsman, Cambria Steel Co., '01. Do., Thompson-Starrett Co., '01-2. Estimator, U. S. Realty & Construction Co., '03. Engr. and Estimator, Levering & Garrigues Co., '04-5. *350 W. 22nd St., New York, N. Y.*

Leonard Shaw, (Mechanical). *179 Koch Ave., Detroit, Mich.*

Harry J. Sproat, (Mechanical). M.S., '02. Dftsman, U. S. Lake Survey, '02. Do., Detroit Shipbuilding Co., '02-4. Eng. Dept., American Radiator Co., '05 to date. *1321 St. Antoine St., Detroit, Mich.*

Ernst Steck, (Electrical). *1520 Wolfram St., Chicago, Ill.*

William W. Talman, (Mechanical). *122 Dubois St., Detroit, Mich.*

James M. Wetmore, (Electrical). *541 Jefferson Ave., Detroit, Mich.*

Bert S. York, (Electrical). M. Internat'l Electrical Congress, St. Louis, '04. Chaser (Tel. Dept.), Western Elect. Co., also Dynamo Tester, '01-2. Construction work on high tension switchboards, Chicago Edison Co., '02-3. Engr., Cutler Hammer Mfg. Co., '03-5. *1432 State St., Milwaukee, Wis.*

Claude E. Young, (Civil). Checker and Squad Boss, Cambria Steel Co., '01-5. *117 South St., Johnstown, Pa.*

Theodore F. H. Zealand, (Mechanical). M. Detroit Eng. Soc.; M. Westinghouse Electric Club; M. Western Railway Club. Dftsman, Motive Power Dept., Mich. Central Ry., '01-4. Do., Union Switch & Signal Co., Swissvale, Pa., '04 to date. *430 Maple Ave., Edgewood Park, Allegheny Co., Pa.*

1902.

Aikman Armstrong, (Mechanical). Business. *307 John R. St., Detroit, Mich.*

Arthur M. Barrett, (Civil). Vice-Pres't. Barret Bindery Co., '02 to date. *3230 Calumet Ave., Chicago, Ill.*

Arthur H. Bennett, (Civil). Dftsman, Russel Wheel & Foundry Co., '02. Do., Pennsylvania Tunnels, New York City, '02 to date. *1 W. 34th St., New York City, N. Y.*

Homer Britton, (Mechanical).

Chason W. Brooks, (Civil). M. Western Soc. of Engrs. Junior Mem. Am. Ry. Eng. and Maintenance of Way Ass'n. Instrumentman, Chicago & Northwestern Ry., '02. Asst. Engr., Toledo, St. Louis & New Orleans Ry., '02-3. Dftsman, Amer. Bdge. Co., '03-4. Asst. Contracting Engr., Wisconsin Bdge. & Iron Co., '04 to date. *6951 Perry Ave., Chicago, Ill.*

William N. Chaffee, (Electrical).

Charles V. Conover, (Mechanical).

Ward A. Detwiler, (Mechanical).

John L. Dickey, (Civil). Junior Engr., U. S. Gov't., '02-5. *Room N, Custom House, New Orleans, La.*

Adolphus M. Dudley, (Electrical). Member Testing Dept., Gen'l Elec. Co., '02-4. Engr., Westinghouse Elec. & Mfg. Co., '04 to date. *429 Kelley Ave., Wilkinsburg, Pa.*

Robert M. Hall, (Mechanical).

William S. Hazelton, (Mechanical). A.B., '01. Asst. Testing Mech. Engr., Ann Arbor R. R., '02. Instr. Machine Design, Armour Inst. Technology, '02-3. Instr. Mech. Eng., Univ. N. Dakota, '03-4. Dftsman, Northern Eng. Wks., Summer, '04. Asst. Prof. M. E., U. of M., '04-5. *1003 Packard St., Ann Arbor, Mich.*

Fred M. Hopkins, (Mechanical). Dftsman, Field, Hinchman & Smith, '03. Asst. Examiner in U. S. Patent Office, '04 to date. *1115 9th St., N. W., Washington, D. C.*

Henry Imhof, (Mechanical).

Roscoe B. Jackson, (Mechanical). Junior Mem. Am. Soc. M. E. Asst. to Dean, Eng. Dept., U. of M., '01-3. Supt. of Const'n, Eng. Bldg., U. of M., '02-4. Instr. in Mech. Eng., U. of M., '03-4. Asst. to Gen'l Supt., Olds Motor Wks., Detroit, '04. Asst. to Gen'l Mangr., Olds Motor Wks., Detroit, '04 to date. *310 Cadillac Ave., Detroit, Mich.*

Roy P. Jackson, (Electrical). Engr., Westinghouse Elect. & Mfg. Co., '02 to date. *429 Kellcy Ave., Wilkinsburg, Pa.*

Harry F. Johnson, (Civil). M. Detroit Eng. Soc. Junior Engr., U. S. Lake Survey, '93 to date. *33 Campau Bldg., Detroit, Mich.*

Edmund P. Kinne, (Mechanical).

Forest H. Lancashire, (Mechanical).

John E. Linabury, (Mechanical). Dftsman, Cutler Hammer Mfg. Co., '02. Designing Dftsman, Bucyrus Co., South Milwaukee, '02-4. Do., Vulcan Iron Wks. Co., '04. Chf. Dftsman, Ohio Steam Shovel Co., '04. Dftsman, Am. Bdge. Co., '04 to date. *616 Baker St., Detroit, Mich.*

Roylance R. McCloy, (Civil). Civil Engr., Bloomshield & McCloy, Bay City, Mich., '02. Dftsman, Am. Bdge. Co., Pittsburg, '03-4. Do., Puget Sound Bdge. & Dredging Co., Seattle, '04. Gen'l Mangr., The Northwestern Co., Seattle, '05. *1410 Harvard Ave., Seattle, Wash.*

Merritt C. McNeil, (Electrical). M. Detroit Eng. Soc. Dftsman, F. F. Van Tuyl & Co., '02. Erecting Engr., Wabash Portland Cement Co., '02-3. Chf. Dftsman, Olds Motor Wks., '03-4. Asst. Mech. Engr., do., '04 to date. *200 Baldwin Ave., Detroit, Mich.*

Percy W. Martin, (Mechanical). M. Detroit Eng. Soc. Dftsman. Industrial Wks., '02-3. Do., Russel Wheel & Foundry Co., '03 to date. *285 Lysander St., Detroit, Mich.*

Robert H. Merrill, (Civil). Junior, Am. Soc., C. E.; do., Western Soc. of Engrs. Dftsman, U. S. Engr. Office, Grand Rapids, '02. Asst. Insp. Harbor Imps., St. Joseph, Mich., Michigan City, Ind., and Grand Haven, Mich., '02-3. Insp. Pier Repair and Extension, Frankfort, Mich., '03. Structural Dftsman, Hydraulic Dredge at Grand Haven, Mich., '04. Insp. Steel Highway Bdge. Erection, Kent Co., Mich., '04. U. S. Junior Engr. with field party, U. S. Engr. Office, Grand Rapids, '04. U. S. Junior Engr., Insp. Harbor Imps., Charlevoix and Petoskey, Mich., '04. Dftsman, City Engr. Office, Grand Rapids, '04-5. U. S. Junior Engr., Petoskey, Mich., '05.
166 Summer St., Grand Rapids, Mich.

Albert Pruessman, (Electrical).

Ralph M. Roosevelt, (Mechanical).

Otto S. Schairer, A.B., (Electrical).

William D. Shaw, (Electrical). Testing Dept., Gen'l Elect. Co., '02-5. *Box 991, Schenectady, N. Y.*

David D. Starr, (Mechanical). Dftsman, Mich. Asylum for Insane, Kalamazoo, Mich., Summer, '02. With Am. Bdge. Co., Erecting Dept., Chicago Office, '02-3. With Am. Bdge. Co. (Erection of Boiler House for the Louisiana Purchase Exposition), '03-4. Since February, '04, not engaged in Engineering work.
Three Rivers, Mich.

Ernest C. Stroebe, (Marine).

Louis N. Udell, (Mechanical).

Warren M. Vandersluis, (Electrical). M. Railway Signal Ass'n. Signal Repairman, Pennsylvania Lines, West of Pittsburgh, '02-3. Signal Foreman, do., '03-4. Signal Inspector, do., '04 to date. *1021 Union Station, Pittsburgh, Pa.*

Frederick C. Wilson, (Civil). Asst. Civil Engr., in charge of Bdges., Elgin, Joliet & Eastern Ry., '02. Instr. Drawing Dept., U. of M., '02-5. *912 Forest Ave., Ann Arbor, Mich.*

Floyd J. Wood, (Electrical). M. Mich. Eng. Soc. Supt. Freeland Mfg. Co. *Niles, Mich.*

1903.

Harry H. Atwell, (Civil). Recorder, U. S. Lake Survey, '03-4. Junior Engr., U. S. Lake Survey, '04.
C/o U. S. Lake Survey, Detroit, Mich.

John G. Barada, (Mechanical). Tester, Gas Engine Dept., Fairbanks, Morse & Co., '03-4. In Power House, Pacific Elect. R. R. Co., '04-5. *333 So. Grand Ave., Los Angeles, Cal.*

Max H. Barber, (Civil). M. Lake Superior Mining Inst. Asst. Mining Engr., Cleveland Cliffs Iron Co., '03-5.
Ishpeming, Mich.

Albert J. Becker, (Mechanical). Asst. Supt. and Dftsman, Kalamazoo Gas Co., '03-4. Instr. in M. E., Univ. of No. Dakota, '04 to date. *616 University Ave., Grand Forks, N. D.*

Homer W. Benton, (Mechanical).

Willis F. Bickel, (Electrical). Storekeeper, paymaster, W. H. Crumb Co., Chicago, '03-4. Wire Chief, Independent Tel. Co., Hot Springs, Ark., '04. Chf. Engr. and Supt. Constr., J. D. Bickel, Produce Co., LaCrosse, Wis., McGregor and Mason City, Ia., since July, '04. *McGregor, Ia.*

Austin P. Biggs, (Mechanical). M.S., '04. Solicitor, Contract Dept., Edison Illuminating Co., '04-5. *201 Locust St., Detroit, Mich.*

Markham Cheever, (Mechanical). Assoc. Am. Inst. of E. E. Asst. to Engr. in Charge, The Ontario Power Co., '03-4. Asst. Field Engr., do., '04 to date. *The Alexandra, Niagara Falls, Ontario.*

Charles P. Chester, (Civil). Recorder U. S. Engr. Office, Louisville, Ky., '03-4. Instrumentman, U. S. Naval Station, Algiers, La., '05. *U. S. Naval Station, Algiers, La.*

Arthur P. Clark, (Civil). Dftsman, Pere Marquette R. R. Bdgs. Engr's Office, Detroit, '03-5. *Dearborn, Mich.*

Harry L. Clute, (Electrical). With Westinghouse Elect. & Mfg. Co., '03-5. With Field, Hinchman & Smith, Detroit, '05 to date. *35 Sibley St., Detroit, Mich.*

James V. Davidson, (Electrical) (Mechanical). Dftsman, Pittsburgh & Allegheny Tel. Co., '03. With Engr. Dept., C. D. & P. Tel. Co., Pittsburgh, '03-4. Stm. Turbine Test, Westinghouse Mach. Co., '04-5. Mngr. Phila. Office, The Lagonda Mfg. Co., '05 to date. *Builders Exchange, Philadelphia, Pa.*

Richard DeYoung, (Civil). Instrumentman and Dftsman, Water Power Development, at Cheboygan, Mich., '03. Dftsman, Am. Bdge. Co., Ambridge, Pa., '04 to date. *Ambridge, Pa.*

Willard J. Dolph, (Mechanical).

John O. Emerson, (Mechanical).

Edward A. Epple, (Mechanical). Mech. Dftsman, Missouri Pacific Ry. Co., '03-4. Machinist on Special Work, St. Louis, Iron Mountain & Southern Ry. Co., '04-5. *141 Riverside Ave., Little Rock, Ark.*

Fay L. Faurote, (Mechanical). Asst. Engr., Olds Motor Wks., Experimental Dept., '03 to date. *310 Cadillac Ave., Detroit, Mich.*

Sidney M. Fechheimer, (Civil). Dftsman, Am. Bdge. Co., Pittsburg, '03-4. Do., Trussed Concrete Steel Co., Detroit, '04 to date. *45 Adelaide St., Detroit, Mich.*

Neal C. Fenkell, (Mechanical). M. Detroit Eng. Soc.; M. Am. Soc. for Testing Material. Dftsman, Riter-Conley Mfg. Co., Pittsburg, '03. Machinist, Westinghouse Mach. Co., Pittsburg, '04. Tunnel Insp., Detroit Water Wks., '04 to date. *273 Field Ave., Detroit, Mich.*

Donald M. Ferguson, (Civil). Estimating Dept., Geo. A. Fuller Co., '03-4. Estimator, Conroy Bros., '04-5. Do., Cranwell Const. Co., '05 to date. *153 W. 46th St., New York City, N. Y.*

Harold R. Finney, (Mechanical).

Albert C. Fitch, (Electrical).

Milton H. Freeman, (Civil). Asst. Engr., M. C. R. R., '03-5.
219 W. Franklin St., Jackson, Mich.

William J. Fyan, (Civil).

Ralph D. Goodrich, (Civil). Asst. Engr. for H. E. Riggs, Toledo, O., '03-4. Do., Marine Basin Co., Brooklyn, N. Y., '04. Insp. Penn., New York & Long Island R. R., East River Section of Penn. Tunnels, '04 to date. *62 E. 34th St., New York, N. Y.*

George Grant, Jr., (Mechanical). M.S., '04.

Jay B. Harris, (Civil). Asst. Engr., Am. Bdge. Co., of New York, '03 to date. *749 E. University Ave., Ann Arbor, Mich.*

Walter E. Himes, (Mechanical).

Stephen A. Hoag, (Mechanical). Structural Dftsman, Brown Hoist. Mach. Co., '01-2. Mechanical Dftsman, Newburgh Steel Co. (Am. Steel & Wire Co.), '03-4. Dftsman, Niagara Constr. Co., Ltd. (Ontario Power Co.), '04. Member of Eng. Corps, Telluride Power Co., Provo, '04 to date.
Olmsted St., Provo City, Utah.

Charles W. Howard, (Mechanical). Dftsman, Riter-Conley Mfg. Co., '03-5. Do., Nat'l Tube Co., '05 to date.
554 Sixth St., McKeesport, Pa.

Harry C. Hutchins, (Mechanical). M. Detroit Eng. Soc. Junior Member, Am. Soc. of M. E. Dftsman, Russel Wheel & Foundry Co., Detroit, '03-4. In Operating Dept., Detroit United Railway, '04. Appraisal Dept., with Field, Hinchman & Smith, Detroit, '04. In Mfg. and Constr. Dept., General Chemical Co., New York, '05. Am. Bdge. Co., New York, '05 to date.
311 W. 95th St., New York City, N. Y.

Howard B. Keeney, (Mechanical).

John W. Kiehle, (Electrical). Eng. Dept., Central District & Printing Telegraph Co., Pittsburgh, '03-5. Eng. Dept., Amer. Telephone & Telegraph Co., '05 to date.
125 Milk St., Boston, Mass.

Earle K. Knight, (Civil).

Stuart K. Knox, (Civil). Rodman, City Engr., Sault Ste. Marie, Mich., '02. Rodman, Lake Superior Power Co., Sault Ste. Marie, Ont., '02. Instrumentman for C. G. Wrentmore, Ann Arbor, Mich., '03. U. S. Insp., U. S. Army Engrs., Grand Rapids, Mich., '03. Asst. Engr., with C. L. Scherer, Beaumont, Tex., '04. Transitman, for W. A. Waldo, Houston, Tex., '04. Timekeeper and Material Man, Thompson-Starrett Co., New York, '04 to date. *623 St. Paul St., Baltimore, Md.*

William A. Lafler, (Civil). Junior Engr., U. S. Gov't., '03 to date. *1515 N. Monroe St.. Peoria, Ill.*

Arthur D. Lodewyck, (Mechanical).

Frank I. Louckes, (Civil).

Don E. Marsh, (Civil).

Henry M. Milburn, (Chemical). Chemist in office of Inspector of Asphalt and Cement, '03-5. *1101 K. St., Washington, D. C.*

William R. Morley, (Civil).

Ralph H. Morton, (Electrical).

Robert B. Otis, (Mechanical). Asst. Chief Insp., Packard Motor Car Co., '03-4. Chf. Insp. Standard Wheel Co., '04-5. Supt. Repair Dept., Woods Motor Vehicle Co., '05 to date. *5044 Prairie Ave., Chicago, Ill.*

Verner L. Page, (Civil). M. Detroit Eng. Soc.. Dftsman, Russel Wheel & Foundry Co., '03-4. Instr., U. of M., '04. Dftsman, Field, Hinchman & Smith, '04 to date. *23 Breckenridge St., Detroit, Mich.*

Fred S. Parmenter, (Mechanical). With Atlantic Refining Co., '03-5. *805 Spruce St., Philadelphia, Pa.*

Moraldus Pierce, (Mechanical). Dftsman, Calumet & Arizona Mining Co., for one year. *Bisbee, Ariz.*

Dene E. Polglase, (Mechanical). Drafting and Erecting, B. F. Sturtevant Co., '03-4. Engr., (Heating and Lighting) Westinghouse, Church, Kerr & Co., '04 to date. *10 Bridge St., C/o W. C. K. & Co., New York, N. Y.*

Earle F. Potter, (Mechanical). Manufacturer, '03 to date. *30 Greenwich Ave., New York, N. Y.*

Karl H. Pratt, (Civil). Time-keeper, Am. Bdge. Co., '03-4. Dftsman, Bdge. Dept., L. S. & M. S. Ry. Co., '04. Estimator, C. M. Griffin & Co., Gen. Contractors, '04 to date. *860 Prospect St., Cleveland, O.*

Frederick C. Purcell, (Mechanical).

Frederick M. Rademacher, (Civil). Dftsman and Estimator, U. S. Engr. Office, Warren River Imp't., '03-4. Charge of Operating and Care of Locks and River, Warren River Imp't., '04. 1st Asst. on Lock No. 3, Warren River Imp't., '04 to date. *C/o U. S. Engr. Office, Tuscaloosa, Ala.*

Henry A. Rademacher, (Mechanical). Dftsman, Sargent & Lundy, '03. Do., Am. Shipbuilding Co., Detroit Branch, '03-4. Engr., Niagara Construction Co., '04 to date. *Box 3, Niagara Falls, N. Y.*

William H. Radford, (Mechanical). Chf. Dftsman, Northern Mfg. Co., Detroit, '03-5. Designer and M. E., Detroit-Oxford Mfg. Co., '05 to date. *Oxford, Mich.*

Edward P. Rich, (Mechanical). Dftsman, Pierce, Richardson & Neiler Co., Engrs., '03 to date. *3254 So. Park Ave., Chicago, Ill.*

John Ross, (Civil). Dftsman, Canadian Bdge. Co., '03-4. Asst. to Engr., Detroit United Ry., '04-5. *43 Chope Place, Detroit, Mich.*

M. Leigh Runner, (Electrical). M. Electric Club, Wilkinsburg. Cabler, Western Electric Co., Chicago, '02. Eng. Apprentice, Westinghouse Elect. & Mfg. Co., '03-5. *812 Franklin Ave., Wilkinsburg, Pa.*

WILLIAM R. RYAN, (Civil).

ERNST A. SCHAEBERLE, (Electrical). M. Electric Club of Wilkinsburg. Engr., Westinghouse Elect. & Mfg. Co., East Pittsburg, '03-5. *812 Franklin St., Wilkinsburg, Pa.*

ALBERT H. SCHUETT, (Civil). M. Detroit Eng. Soc. M. Detroit Archt. Club. Dftsman, Am. Bdge. Co., '03. Instrumentman, Mich. Cent'l R. R., '03-4. Dftsman, Mueller & Mildner, Detroit, '04-5. Do., Canadian Bdge. Co., Walkerville, Ont., '05. Dftsman, Trussed Concrete Steel Co., Detroit, '05 to date. *372 Maybury Ave., Detroit, Mich.*

ROIE C. SEERY, (Civil).

FRANCIS D. SHENK, (Chemical). M. Soc. of Chemical Industry. Chemist and Buyer, Traugott Schmidt & Sons, '03-5. *Grand Rapids, Mich.*

STUART SIMS, (Civil).

FREDERIC C. STEVENS, (Civil). Dftsman, Am. Bdge. Co., '03. Treas., Amer. Printing House, New York City, '03-4. Treas. and Gen'l Mngr., Greenwoch Press, New York City, '04 to date. *9 W. 68th St., New York, N. Y.*

HERBERT L. ST. JOHN, (Civil).

JAMES M. TAGGART, (Mechanical).

LESLIE J. TEFFT, (Chemical).

WILLIAM F. TEMPLE, (Mechanical). Dftsman, Stewart Hartshorn Co. (Shade Rollers), '03 to date. *386 Washington Ave., Muskegon, Mich.*

JEROME A. UTLEY, (Mechanical). Dftsman, Lake Superior Smelting Co., Dollar Bay, Mich., '04. Do., Amer. Car & Foundry Co., '04-5. *146 Forest E., Detroit, Mich.*

D. WARREN WEBSTER, (Civil). Surveyman, U. S. Gov't. on Ill. and Desplaines River Survey, '03-4. Junior C. E., U. S. Gov't. Survey of Guantanamo Harbor, '04 to date. *U. S. Naval Station, Guantanamo, Cuba.*

ARTHUR C. WHEELER, (Civil). Junior Engr., U. S. Survey of Ill. River, '03-5. U. S. Engr., Insular Dept., Philippine Gov't., '05 to date. *1515 N. Monroe St., Peoria, Ill.*

HARRYY P. WHERRY, (Chemical). M. Am. Chemical Soc.; M. Soc. of Chem. Industry; M. Verein Deutscher Chemiker. Chf. Chemist, Dickman, Mackenzie & Potter, Chicago, '03-4. Asst. Chemist, B. & M. C. C. & S. Mining Co., '04-5. *C/o Boston & Montana Consolidated Copper & Silver Mining Co., Great Falls, Mont.*

WILLIAM L. WILLS, (Marine). Dftsman, Marine Dept., Maryland Steel Co., '03-5. Estimating in Scientific Dept., Newport News Shipbuilding & Dry Dock Co., '05 to date. *327 49th St., Newport News, Va.*

FRED A. WYCKOFF, (Civil).

1904.

William H. Allen, Jr., (Chemical). M. Detroit Eng. Soc. Technical Asst., Coke Oven Dept. of Solvay Process Co., '04-5. *C/o Solvay Process Co., Detroit, Mich.*

Egmont B. Arnold, (Mechanical). M. Eng. Soc. Machinist, Power & Mining Mach. Co., '04. Dftsman, do., '05. *462 Van Buren, Milwaukee, Wis.*

Santiago Artiaga, (Civil). Transitman, Dept. of Eng. and Public Wks., City of Manila, P. I., '04 to date. *69 Alix St., Manila, P. I.*

Bert W. Bachtel, (Mechanical). With Field, Hinchman & Smith, '04-5. *Detroit, Mich.*

Walter A. Barrett, (Mechanical). Special Apprentice, Bass Foundry & Machine Co., '04-5. *2325 Fairfield Ave., Fort Wayne, Ind.*

John R. Bartlett, (Civil). Mining with Speculator Mining Co., '04. *The Montana, Butte, Mont.*

Carroll Biggs, (Civil). Dftsman, City Engr., Grand Rapids, Mich., '04. Street Clerk, Laclede Gas Light Co., St. Louis, Mo., '04. Dftsman, C. H. & S. Ry., Cincinnati, Ohio, '05 to date. *1002 Celestial St., Cincinnati, Ohio.*

George W. Blackinton, (Mechanical and Electrical). Dftsman, Field, Hinchman & Smith, Detroit, '04. Eng. Force, Consolidated Eng. Co., Chicago, '05 to date. *213 N. 9th St., Flint, Mich.*

James F. Bourquin, (Mechanical). With Olds Motor Wks., '04-5. *Detroit, Mich.*

Grant D. Bradshaw, (Mechanical). Junior, Am. Soc. M. E. Steam Expert, Joliet Wks., Ill. Steel Co., '04 to date. *1109 Cass St., Joliet, Ill.*

Eugene S. Brewer, (Electrical). Student Member, Am. Inst. of E. E. M. Mich. Eng. Soc. General Eng. Practice, Josline & Brewer, '04-5. *508 Oliver St., Owosso, Mich.*

Valreen C. Campbell, (Civil). *Jackson, Mich.*

David H. Clary, (Chemical). Holder of Gas Eng. Fellowship, U. of M., '04-5. Apprentice, Jackson Gas Co. *Jackson, Mich.*

Henry J. Clemens, (Electrical).

John K. Cochran, (Civil).

William G. Cook, (Civil). M. Univ. of Mich. Eng. Soc.; M. Sigma Xi. Dftsman, Am. Bdge. Co., Toledo Plant, '04-5. Do., Russel Wheel & Foundry Co., Detroit, '05 to date. *533 Woodward Ave., Detroit, Mich.*

Carl T. Cotter, (Mechanical). Chf. Dftsman, C. E. Sutton Co., Toledo, '04. Instr. in Mech. Drawing, Toledo Univ., '04 to date. *538 Western Ave., Toledo, Ohio.*

George A. Cunningham, (Civil). Instrumentman, Chicago & North Western Ry., '04 to date. *734 Wayne Ave., Indiana, Pa.*

Myron G. Doll, (Chemical). Chem. Engr. for Globe Soap Co., Cincinnati, O., '05. *121 W. 9th St., Cincinnati, O.*

Gerard C. Dodge, (Civil). Asst. Instr. in Surveying, U. of M., Summer of '04. Asst. in Water Gas Dept., Laclede Gas Light Co., St. Louis, Mo., '04-5. Asst. to Benjamin Thompson, Consulting Engr., '05 to date. *317 Fannin St., Chattanooga, Tenn.*

Harry P. Drake, (Civil). With U. S. Gov't. Engrs., Panama Canal, '04-5. *Matachin, Canal Zone, Panama.*

Allan T. Dusenbury, (Mechanical). With Advance Pump & Compressor Co., '04 to date. *101 Garrison Ave., Battle Creek, Mich.*

Frank C. Emerson, (Civil). Asst. City Engr., Saginaw, Mich., '04. Private practice in Irrigation Eng'g at Cora, Wyo., since Sept. 1st, '04. *Cora, Fremont Co., Wyo.*

John E. Evans, (Civil). Instrumentman, Mich. Central R. R. Co., '04 to date. *413 Maple St., Ypsilanti, Mich.*

Earl A. Finkbeiner, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *524 E. 2nd St., Dayton, O.*

Alfred C. Finney, (Electrical). Grad. Mem. U. of M. Eng. Soc. Student Mem. Am. Inst. E. E. With Oak Park Yaryan Co., '04-5. Testing Dept., Gen'l Elect. Co., Schenectady, N. Y., May '05 to date. *418 So. Boulevard, Oak Park, Ill.*

Robert S. Fleshiem, (Electrical). Student Mem. Am. Inst. E. E. Apprentice, Bullock Elect. Mfg. Co., '04 to date. *4278 Ashland Ave., Norwood, O.*

Earl A. Forkner, (Electrical). With Western Elect. Co., Chicago. *3758 Ellis Ave., Chicago, Ill.*

David R. Fraser, Jr., (Mechanical). Machinist, Power & Mining Mach. Co., at Cudahy, '04. In Experimental Dept., do., '04 to date. *462 Van Buren St., Milwaukee, Wis.*

Charles A. Fuller, (Mechanical). Dftsman, Murphy Iron Wks., '04-5. Dftsman, Great Lakes Eng. Wks., '05 to date. *150 Bethune St., E., Detroit, Mich.*

Thomas G. Gale, (Mechanical). In lumber business with the Gale Lumber Co., since graduation. *West Branch, Mich.*

John A. Garrett, (Mechanical). With Fairbanks, Morse & Co., Beloit, '04. Exhibit Engr., Lewis & Clark Exposition, Portland, Ore., '05.

George W. Gilkey, (Mechanical). With the Michigan Paper Co., since graduation. *Plainwell, Mich.*

Herbert S. Graver, (Civil). Dftsman, Wm. Graver Tank Wks., '04 to date. *6122 Stewart Ave., Chicago, Ill.*

Arthur C. Green, (Mechanical). Dftsman, Bucyrus Co., '04-5. *Box 24, South Milwaukee, Wis.*

Mark H. Gregg, (Mechanical). M.S., '05. Asst. in M. E., U of M., '04-5. *311 Thompson St., Ann Arbor, Mich.*

Bertram V. R. Hall, (Civil). Dftsman, City Engr's Office, Grand Rapids, Mich., '04. Asst. City Engr., Manistee, Mich., '04. Estimator, Converse Bdge. Co., '05.
317 Fannin St., Chattanooga, Tenn.

Morris A. Hall, (Mechanical). In charge erection work, shop of Whitehead & Kales Iron Wks., Detroit, '04-5. Chf. Dftsman, office of F. A. Shoemaker, M.E., Buffalo, '05 to date..
234 West Ave., Buffalo, N. Y.

Rolland S. Hall, (Civil). Eng'g Aid, Reclamation Service, U. S. Geol. Survey, '04 to date.
C/o U. S. Geological Survey, Pendleton, Ore.

Harry A. Harris, (Electrical). Power Engr., Stromberg-Carlson Tel. Mfg. Co., '04-5. *46 Vick Park "A," Rochester, N. Y.*

Max P. Heavenrich, (Civil). M. U. of M. Eng. Soc. Transit, U. S. Gov't Light House. Dftsman, Canadian Bdge. Co. Dftsman and Erector on Construction Work, Trussed Concrete Steel Co., *25 High St., W., Detroit, Mich.*

Edward L. Hogan, (Electrical and Mechanical). M.S. '05. Graduate Student in Dept. of Eng., U. of M., '04-5. Asst. in Mech. Eng., U. of M., '04-5. *607 E. Huron St., Ann Arbor, Mich.*

William M. Hogle, (Mechanical). M. Mich. Eng. Soc. Dftsman, E. G. Staude, builder and designer special mach., Minneapolis, '04. Do., Olds Motor Works, Lansing, '04-5. Designing Dftsman, Pope, Toledo, '05 to date.
2203 Maplewood St., Toledo, O.

Arthur Holmes, (Mechanical). Jun., Am. Soc. M. E. Experimental Dept., Olds Motor Works, '04 to date.
C/o Olds Motor Works, Detroit, Mich.

Harold Hooker, (Civil). Estimator, J. C. McFarland & Co., '04 to date.
C/o J. C. McFarland & Co., 27th St. and 5th Ave., Chicago, Ill.

Samuel Horner, (Civil).

William O. Houston, (Civil). Instrumentman, Mich. Central R. R., '04. Asst. Engr., East Louisiana R. R., '05 to date.
Covington, La.

Cortes Johnson, (Civil). Asst. in Civil Eng., Iowa State College, '04 to date. *1003 Burnett St., Ames, Ia.*

Clarence L. Keller, (Electrical). Student Member Am. Inst. E. E. Dftsman, Detroit United Ry., Mech. Dept., '04 to date.
83 Leverette St., Detroit, Mich.

Stewart B. Kingsbury, (Marine). Goodrich Steamship Line, '04. Racine Boat Co., '04. *Muskegon, Mich.*

Lester Kirschbraun, (Chemical). M. Am. Chem. Soc. Asst. Chemist, Union Pacific R. R., '04 to date.
1046 Georgia Ave., Omaha, Nebr.

Walter F. Kneip, (Mechanical). Jun., Am. Soc. M. E. Exp. Dept., Olds Motor Works, '04 to date.
321 Concord St., Detroit, Mich.

Harlow Lewis, (Civil). Timekeeper, Thompson-Starrett Co., '02-3. Engr., do., '03-4. Supt., do., '04 to date.
60 Massachusetts Ave., N. E., Washington, D. C.

James E. McAfee, (Mechanical). Designing and Estimating, Heating and Ventilating Dept., Thompson-Starrett Co., '04-5. Material man on outside constr., do., '05 to date.
1909 I St., N. W., Washington, D. C.

William C. McBain, (Mechanical). Jun. Mem. Am. Soc. M. E. Turbine and Gas Engine Tester, General Elect. Co., '04-5. Computor, The William Tod Co.
78 Williamson Ave., Youngstown, O.

Harryy E. McDonnell, (Mechanical). Estimating in Scientific Dept., Newport News Shipbuilding & Dry Oven Co., 6 months.
123 32nd St., Newport News, Va.

Fred M. McLean, (Civil). Insp. Board of Trustees, Commissioner of Water Wks., Cincinnati, O., '04-5. Asst. Engr., Vera Cruz al Pacifico R. R., '05 to date.
Ferrocarril Vera Cruz al Pacifico, Tierra Blanca, Vera Cruz, Mexico.

John R. Mansfield, (Mechanical).

William J. Matthews, (Civil). Supt. of Constr., Weber Steel-Concrete Chimney Co., Chicago.
6509 Drexxel Ave., Chicago, Ill.

William B. May, (Civil). M. Univ. of Mich. Eng. Soc. On Field Surveys, Jackson & Suburban Traction Co., '01. Do., Jackson & Battle Creek Traction Co., '01-2. Asst. Engr., Plainwell Power Co., Plainwell, Mich., '02. Resident Engr., Riggs & Sherman Construction Co., Toledo, O., '03. Asst. Chf. Engr., Duluth & Northern Minn. Ry., '04 to date.
Knife River, Minn.

Oscar F. Mead, (Electrical).

Hubert H. Montague, (Electrical). M. Mich. Eng. Soc. Student, Western Elect. Co., '04-5. *585 Congress St., Chicago, Ill.*

William C. Mundt, (Civil). Transitman, S. F. Roess, City Engr., Oil City, '04-5. *C/o City Engr's. Owce, Oil City, Pa.*

John H. Mustard, (Electrical). M. Electric Club. Apprentice, Westinghouse Elect. & Mfg. Co., '04-5.
812 Franklin Ave., Wilkinsburg, Pa.

Oscar E. Olson, (Civil).

Leon A. Paddock, (Civil). Canadian Bdge. Co.
Walkerville, Ontario.

Walter B. Perry, (Mechanical). Dftsman, Gen'l Elect. Co., Lynn, Mass., '04. Curtis Turbine Test., do., '04-5. Special Machine Shop Apprentice, The Wm. Tod Co., '05 to date.
78 Williamson Ave., Youngstown, O.

William E. Post, (Marine). Dftsman, Great Lakes Eng. Wks., Hull Dept., '04 to date. *310 Vinewood Ave., Detroit, Mich.*

JESSE T. PRATT, (Mechanical). Machine Designing, L. A. Pratt, '04, to date. *415 Grant Place, Bay City, Mich.*

HARRIS P. RALSTON, A.B. (Chemical). Dftsman, The Solvay Process Co., '04-5. Foreman of Elect. Dept., do., '05 to date. *533 Woodward Ave., Detroit, Mich.*

BIRTRAM W. RANSON, (Civil). With Am. Bdge. Co., Toledo, O. *1012 Huron St., Toledo, O.*

LEWIS C. ROGERS, (Mechanical). M. Detroit Eng. Soc. Testing Engr., The Solvay Process Co., '04 to date. *The Solvay Process Co., Detroit, Mich.*

SYDNEY R. RUSSEL, (Mechanical). Dftsman, Great Lakes Eng. Wks., '05 to date. *863 Jefferson Ave., Detroit, Mich.*

JOHN W. SEENS, (Civil). M. Detroit Eng. Soc. Dftsman, Canadian Bdge. Co., Walkerville, Ont., '04 to date. *1225 Jefferson Ave., Detroit, Mich.*

WILLIAM SEYMOUR, (Chemical). Chemist, Grand Rapids Gas Light Co., 6 months. *275 Sheldon St., Grand Rapids, Mich.*

CARL H. SMITH, (Civil). Student and County Sec., Michigan Y. M. C. A. *302 Townsend St., Lansing, Mich.*

MORRIS H. STIMSON, (Mechanical). M. Univ. of Mich. Eng. Soc. Apprentice Am. Radiator Co., Detroit, '04-5. *533 Woodward Ave., Detroit, Mich.*

WALTER P. STINE, (Civil). Rodman on Panama Canal, 0'4. Levelman, do., '04-5. Asst. Engr., Republic of Panama., '05 to date. *Chitre, Republic of Panama.*

CHARLES R. SWINEFORD, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *524 East 2nd St., Dayton, O.*

JUAN F. R. TECSON, (Civil).

GEORGE G. THOMPSON, (Electrical). Machinist, Olds Motor Wks., '04. Asst. Power Dept., Edison Illum'g Co., '04-5. Dftsman, F. F. Van Tuyl, '05 to date. *59 Park St., Detroit, Mich.*

ROBERT R. THOMSON, (Mechanical). Testing Dept., General Elect. Co., '04 to date. *3 N. College St., Schenectady, N. Y.*

JOHN S. TYLER, (Mechanical). Special Apprentice, P. C. C. & St. L. R. R. *160 N. 20th St., Columbus, O.*

RALPH A. VAIL, (Mechanical). Experimental Dept., Olds Motor Wks. *1225 Jefferson Ave., Detroit, Mich.*

JOHN M. VAN SPLUNTER, (Electrical). With Allington & Co., Heating and Ventilating Engrs. *Saginaw, Mich.*

OSWALD W. VISSCHER, (Electrical). A.B. (Hope) '01. A.B. (U. of M.) '03. Student, Western Elect. Co., '04-5. *585 Congress St., Chicago, Ill.*

DONALD C. WAITE, (Civil). Jun. Mem. Am. Soc. C. E. Rodman, Interborough Rapid Transit Co., of New York City, '04 to date. *17 Greenvale Ave., Yonkers, N. Y.*

WILLIAM T. WALKER, JR., (Mechanical and Electrical). M. Toledo Soc. of Engrs. Dftsman, F. F. Van Tuyl, Detroit. Mngr. Branch Office, Toledo, '04-5. *719 Spitzer Bldg., Toledo, O.*

Otto C. Walther, (Electrical). Testing Dept., General Elect. Co.
Schenectady, N. Y.

Edward N. Walton, (Mechanical). Engine Testing, Fairbanks, Morse & Co., '04-5. *1049 Church St., Beloit, Wis.*

Charles A. Waring, (Mechanical). Kenneth Anderson Mfg. Co., Detroit. *Detroit, Mich.*

Edward A. Weiland, (Mechanical and Electrical). Dftsman, Solvay Process Co., '04-5. Asst. Chf. Dftsman, do., '05 to date.
19 Cottrell Ave., Delray, Mich.

Alfred H. White, A.B. M. Am. Chem. Soc. M. Soc. of Chem. Industry. M. Mich. Gas Ass'n. Asst. Professor of Chem. Technology, U. of M., '04 to date.
1017 Hill St., Ann Arbor, Mich.

John A. Whiting, (Civil). Field Asst. State Engr. of Wyo., Summer '04. Engaged in private practice since.
501 E. 18th St., Cheyenne, Wyo.

Carlos A. Williston, (Civil).

Vernon C. Wood, (Marine). Dftsman, Manitowoc Dry Dock Co., '04 to date. *702 Park St., Manitowoc, Wis.*

Jesse C. Wright, (Civil).

Arton E. Yokom, (Civil). Rodman, Panama Canal, '04-5. Levelman, do., '05 to date. *Gladstone, Mich.*

Henry M. Milburn, (Chemical). Chemist in office of Inspector of Asphalt and Cement, '03-5. *1101 K. St., Washington, D. C.*

William R. Morley, (Civil).

Ralph H. Morton, (Electrical).

Robert B. Otis, (Mechanical). Asst. Chief Insp., Packard Motor Car Co., '03-4. Chf. Insp. Standard Wheel Co., '04-5. Supt. Repair Dept., Woods Motor Vehicle Co., '05 to date.
5044 Prairie Ave., Chicago, Ill.

Verner L. Page, (Civil). M. Detroit Eng. Soc.. Dftsman, Russel Wheel & Foundry Co., '03-4. Instr., U. of M., '04. Dftsman, Field, Hinchman & Smith, '04 to date.
23 Breckenridge St., Detroit, Mich.

Fred S. Parmenter, (Mechanical). With Atlantic Refining Co., '03-5. *805 Spruce St., Philadelphia, Pa.*

Moraldus Pierce, (Mechanical). Dftsman, Calumet & Arizona Mining Co., for one year. *Bisbee, Ariz.*

Dene E. Polglase, (Mechanical). Drafting and Erecting, B. F. Sturtevant Co., '03-4. Engr., (Heating and Lighting) Westinghouse, Church, Kerr & Co., '04 to date.
10 Bridge St., C/o W. C. K. & Co., New York, N. Y.

Earle F. Potter, (Mechanical). Manufacturer, '03 to date.
30 Greenwich Ave., New York, N. Y.

Karl H. Pratt, (Civil). Time-keeper, Am. Bdge. Co., '03-4. Dftsman, Bdge. Dept., L. S. & M. S. Ry. Co., '04. Estimator, C. M. Griffin & Co., Gen. Contractors, '04 to date.
860 Prospect St., Cleveland, O.

Frederick C. Purcell, (Mechanical).

Frederick M. Rademacher, (Civil). Dftsman and Estimator, U. S. Engr. Office, Warren River Imp't., '03-4. Charge of Operating and Care of Locks and River, Warren River Imp't., '04. 1st Asst. on Lock No. 3, Warren River Imp't., '04 to date.
C/o U. S. Engr. Office, Tuscaloosa, Ala.

Henry A. Rademacher, (Mechanical). Dftsman, Sargent & Lundy, '03. Do., Am. Shipbuilding Co., Detroit Branch, '03-4. Engr., Niagara Construction Co., '04 to date.
Box 3, Niagara Falls, N. Y.

William H. Radford, (Mechanical). Chf. Dftsman, Northern Mfg. Co., Detroit, '03-5. Designer and M. E., Detroit-Oxford Mfg. Co., '05 to date. *Oxford, Mich.*

Edward P. Rich, (Mechanical). Dftsman, Pierce, Richardson & Neiler Co., Engrs., '03 to date.
3254 So. Park Ave., Chicago, Ill.

John Ross, (Civil). Dftsman, Canadian Bdge. Co., '03-4. Asst. to Engr., Detroit United Ry., '04-5. *43 Chope Place, Detroit, Mich.*

M. Leigh Runner, (Electrical). M. Electric Club, Wilkinsburg. Cabler, Western Electric Co., Chicago, '02. Eng. Apprentice, Westinghouse Elect. & Mfg. Co., '03-5.
812 Franklin Ave., Wilkinsburg, Pa.

Index to Register of Alumni

NAME	CLASS	PAGE
Abel, W. S.	1878	140
Adler, A. K.	1894	164
Aikine, O. H.	1877	140
Alexander, H. B.	1869	130
Allen, D. C.	1876	139
Allen, J. R.	1892	158
Allen, W. H., Jr.	1904	200
Allmendinger, G. F.	1878	141
Allor, E. L.	1892	158
Ames, R. L.	1894	164
Anderson, E.	1899	184
Anderson, F.	1890	154
Anderson, L. D.	1901	191
Anderson, L. W.	1895	167
Arey, A. L.	1875	137
Arey, C. O.	1878	141
Arizpe, E.	1901	191
Armstrong, A.	1902	193
Armstrong, J. C.	1899	184
Arnold, E. B.	1904	200
Arnold, F. E.	1899	184
Artiaga, S.	1904	200
Atkins, C. G.	1893	160
Atwell, H. H.	1903	195
Austin, W. M.	1895	167
Ayers, J.	1880	143
Ayers, N. B.	1899	184
Bachtel, B. W.	1904	200
Baggott, C. W.	1898	180
Bailey, B. F.	1898	180
Baillie, F. S.	1890	154
Bain, F. M.	1868	129
Baker, F. J.	1887	148
Baker, F. L.	1897	177
Baker, H. W.	1877	140
Baker, L.	1875	137
Baker, W. P.	1899	184
Baldwin, A. E.	1871	133
Baldwin, C. C.	1875	137
Baldwin, H.	1893	160
Baldwin, W. S.	1901	191
Ball, W. D.	1890	154
Barada, J. G.	1903	195
Barber, M. H.	1903	195
Barnard, H.	1874	136
Barnes, M. G.	1896	171
Barnum, T. E.	1892	158
Barr, F. C.	1898	180
Barrett, A. M.	1902	193
Barrett, W. A.	1904	200
Bary, M.	1897	177
Bates, H. D.	1875	138
Bartlett, J. R.	1904	200
Bassett, W.	1892	158
Bauer, E.	1885	146
Beach, F. P.	1898	180
Beach, R. W.	1886	147
Beadle, C. S.	1879	142
Bean, C. O.	1874	136
Beattie, M. B.	1900	188
Beaumont, J. A.	1880	143
Beaumont, S. F.	1880	143
Becker, A. J.	1903	195
Becker, A. L.	1894	165
Beckstrand, E. H.	1900	188
Bellows, C. F.	1864	126
Benedict, E. L.	1901	191
Bennett, A. H.	1902	193
Bennett, J. W. F.	1899	184
Benson, A. R.	1890	154
Bentley, C.	1900	188
Benton, H. W.	1903	195
Benzenberg, G. H.	1867	128
Bergbom, F. A.	1900	188
Bibbins, J. R.	1899	184
Bickel, W. F.	1903	196
Biggs, A. P.	1903	196
Biggs, C.	1904	200
Billings, W. G.	1895	167
Bird, J. C.	1894	165
Bird, J. S.	1870	131
Birdsall, A. W.	1897	177
Birdsall, B. Jr.	1875	138
Blackinton, G. W.	1904	200
Blackwood, J. Y.	1893	160
Blaess, A.	1895	167
Blair, J.	1894	165
Blanchard, M.	1898	180
Bliss, F. E.	1873	135
Boomhower, F. H.	1898	180
Borst, F. C.	1898	180
Borst, W. C.	1896	172
Boss, C. M.	1870	131
Boughton, W. H.	1893	160
Bourquin, J. F.	1904	200
Bouton, W.	1865	127
Bowen, B. B.	1886	149
Boyer, A. P.	1871	133
Bradley, F. N.	1900	188
Bradshaw, G. D.	1904	200
Bragg, T. A.	1898	180
Brandon, G. R.	1891	156
Brenton, W. H.	1883	144
Brewer, E. S.	1904	200
Britten, D. A.	1897	177
Britton, H.	1902	193
Broadman, W. H.	1869	130
Brooks, C. W.	1902	193
Brown, C. C.	1879	142
Brown, G. A.	1881	143

Henry M. Milburn, (Chemical). Chemist in office of Inspector of Asphalt and Cement, '03-5. *1101 K. St., Washington, D.C.*

William R. Morley, (Civil).

Ralph H. Morton, (Electrical).

Robert B. Otis, (Mechanical). Asst. Chief Insp., Packard Motor Car Co., '03-4. Chf. Insp. Standard Wheel Co., '04-5. Supt. Repair Dept., Woods Motor Vehicle Co., '05 to date. *5044 Prairie Ave., Chicago, Ill.*

Verner L. Page, (Civil). M. Detroit Eng. Soc.. Dftsman, Russel Wheel & Foundry Co., '03-4. Instr., U. of M., '04. Dftsman, Field, Hinchman & Smith, '04 to date. *23 Breckenridge St., Detroit, Mich.*

Fred S. Parmenter, (Mechanical). With Atlantic Refining Co., '03-5. *805 Spruce St., Philadelphia, Pa.*

Moraldus Pierce, (Mechanical). Dftsman, Calumet & Arizona Mining Co., for one year. *Bisbee, Ariz.*

Dene E. Polglase, (Mechanical). Drafting and Erecting, B. F. Sturtevant Co., '03-4. Engr., (Heating and Lighting) Westinghouse, Church, Kerr & Co., '04 to date. *10 Bridge St., C/o W. C. K. & Co., New York, N. Y.*

Earle F. Potter, (Mechanical). Manufacturer, '03 to date. *30 Greenwich Ave., New York, N. Y.*

Karl H. Pratt, (Civil). Time-keeper, Am. Bdge. Co., '03-4. Dftsman, Bdge. Dept., L. S. & M. S. Ry. Co., '04. Estimator, C. M. Griffin & Co., Gen. Contractors, '04 to date. *860 Prospect St., Cleveland, O.*

Frederick C. Purcell, (Mechanical).

Frederick M. Rademacher, (Civil). Dftsman and Estimator, U. S. Engr. Office, Warren River Imp't., '03-4. Charge of Operating and Care of Locks and River, Warren River Imp't., '04. 1st Asst. on Lock No. 3, Warren River Imp't., '04 to date. *C/o U. S. Engr. Office, Tuscaloosa, Ala.*

Henry A. Rademacher, (Mechanical). Dftsman, Sargent & Lundy, '03. Do., Am. Shipbuilding Co., Detroit Branch, '03-4. Engr., Niagara Construction Co., '04 to date. *Box 3, Niagara Falls, N. Y.*

William H. Radford, (Mechanical). Chf. Dftsman, Northern Mfg. Co., Detroit, '03-5. Designer and M. E., Detroit-Oxford Mfg. Co., '05 to date. *Oxford, Mich.*

Edward P. Rich, (Mechanical). Dftsman, Pierce, Richardson & Neiler Co., Engrs., '03 to date. *3254 So. Park Ave., Chicago, Ill.*

John Ross, (Civil). Dftsman, Canadian Bdge. Co., '03-4. Asst. to Engr., Detroit United Ry., '04-5. *43 Chope Place, Detroit, Mich.*

M. Leigh Runner, (Electrical). M. Electric Club, Wilkinsburg. Cabler, Western Electric Co., Chicago, '02. Eng. Apprentice, Westinghouse Elect. & Mfg. Co., '03-5. *812 Franklin Ave., Wilkinsburg, Pa.*

WILLIAM R. RYAN, (Civil).

ERNST A. SCHAEBERLE, (Electrical). M. Electric Club of Wilkinsburg. Engr., Westinghouse Elect. & Mfg. Co., East Pittsburg, '03-5. *812 Franklin St., Wilkinsburg, Pa.*

ALBERT H. SCHUETT, (Civil). M. Detroit Eng. Soc. M. Detroit Archt. Club. Dftsman, Am. Bdge. Co., '03. Instrumentman, Mich. Cent'l R. R., '03-4. Dftsman, Mueller & Mildner, Detroit, '04-5. Do., Canadian Bdge. Co., Walkerville, Ont., '05. Dftsman, Trussed Concrete Steel Co., Detroit, '05 to date. *372 Maybury Ave., Detroit, Mich.*

ROIE C. SEERY, (Civil).

FRANCIS D. SHENK, (Chemical). M. Soc. of Chemical Industry. Chemist and Buyer, Traugott Schmidt & Sons, '03-5. *Grand Rapids, Mich.*

STUART SIMS, (Civil).

FREDERIC C. STEVENS, (Civil). Dftsman, Am. Bdge. Co., '03. Treas., Amer. Printing House, New York City, '03-4. Treas. and Gen'l Mngr., Greenwoch Press, New York City, '04 to date. *9 W. 68th St., New York, N. Y.*

HERBERT L. ST. JOHN, (Civil).

JAMES M. TAGGART, (Mechanical).

LESLIE J. TEFFT, (Chemical).

WILLIAM F. TEMPLE, (Mechanical). Dftsman, Stewart Hartshorn Co. (Shade Rollers), '03 to date. *386 Washington Ave., Muskegon, Mich.*

JEROME A. UTLEY, (Mechanical). Dftsman, Lake Superior Smelting Co., Dollar Bay, Mich., '04. Do., Amer. Car & Foundry Co., '04-5. *146 Forest E., Detroit, Mich.*

D. WARREN WEBSTER, (Civil). Surveyman, U. S. Gov't. on Ill. and Desplaines River Survey, '03-4. Junior C. E., U. S. Gov't. Survey of Guantanamo Harbor, '04 to date. *U. S. Naval Station, Guantanamo, Cuba.*

ARTHUR C. WHEELER, (Civil). Junior Engr., U. S. Survey of Ill. River, '03-5. U. S. Engr., Insular Dept., Philippine Gov't., '05 to date. *1515 N. Monroe St., Peoria, Ill.*

HARRYY P. WHERRY, (Chemical). M. Am. Chemical Soc.; M. Soc. of Chem. Industry; M. Verein Deutscher Chemiker. Chf. Chemist, Dickman, Mackenzie & Potter, Chicago, '03-4. Asst. Chemist, B. & M. C. C. & S. Mining Co., '04-5. *C/o Boston & Montana Consolidated Copper & Silver Mining Co., Great Falls, Mont.*

WILLIAM L. WILLS, (Marine). Dftsman, Marine Dept., Maryland Steel Co., '03-5. Estimating in Scientific Dept., Newport News Shipbuilding & Dry Dock Co., '05 to date. *327 49th St., Newport News, Va.*

FRED A. WYCKOFF, (Civil).

1904.

William H. Allen, Jr., (Chemical). M. Detroit Eng. Soc. Technical Asst., Coke Oven Dept. of Solvay Process Co., '04-5. *C/o Solvay Process Co., Detroit, Mich.*

Egmont B. Arnold, (Mechanical). M. Eng. Soc. Machinist, Power & Mining Mach. Co., '04. Dftsman, do., '05. *462 Van Buren, Milwaukee, Wis.*

Santiago Artiaga, (Civil). Transitman, Dept. of Eng. and Public Wks., City of Manila, P. I., '04 to date. *69 Alix St., Manila, P. I.*

Bert W. Bachtel, (Mechanical). With Field, Hinchman & Smith, '04-5. *Detroit, Mich.*

Walter A. Barrett, (Mechanical). Special Apprentice, Bass Foundry & Machine Co., '04-5. *2325 Fairfield Ave., Fort Wayne, Ind.*

John R. Bartlett, (Civil). Mining with Speculator Mining Co., '04. *The Montana, Butte, Mont.*

Carroll Biggs, (Civil). Dftsman, City Engr., Grand Rapids, Mich., '04. Street Clerk, Laclede Gas Light Co., St. Louis, Mo., '04. Dftsman, C. H. & S. Ry., Cincinnati, Ohio, '05 to date. *1002 Celestial St., Cincinnati, Ohio.*

George W. Blackinton, (Mechanical and Electrical). Dftsman, Field, Hinchman & Smith, Detroit, '04. Eng. Force, Consolidated Eng. Co., Chicago, '05 to date. *213 N. 9th St., Flint, Mich.*

James F. Bourquin, (Mechanical). With Olds Motor Wks., '04-5. *Detroit, Mich.*

Grant D. Bradshaw, (Mechanical). Junior, Am. Soc. M. E. Steam Expert, Joliet Wks., Ill. Steel Co., '04 to date. *1109 Cass St., Joliet, Ill.*

Eugene S. Brewer, (Electrical). Student Member, Am. Inst. of E. E. M. Mich. Eng. Soc. General Eng. Practice, Josline & Brewer, '04-5. *508 Oliver St., Owosso, Mich.*

Valreen C. Campbell, (Civil). *Jackson, Mich.*

David H. Clary, (Chemical). Holder of Gas Eng. Fellowship, U. of M., '04-5. Apprentice, Jackson Gas Co. *Jackson, Mich.*

Henry J. Clemens, (Electrical).

John K. Cochran, (Civil).

William G. Cook, (Civil). M. Univ. of Mich. Eng. Soc.; M. Sigma Xi. Dftsman, Am. Bdge. Co., Toledo Plant, '04-5. Do., Russel Wheel & Foundry Co., Detroit, '05 to date. *533 Woodward Ave., Detroit, Mich.*

Carl T. Cotter, (Mechanical). Chf. Dftsman, C. E. Sutton Co., Toledo, '04. Instr. in Mech. Drawing, Toledo Univ., '04 to date. *538 Western Ave., Toledo, Ohio.*

George A. Cunningham, (Civil). Instrumentman, Chicago & North Western Ry., '04 to date. *734 Wayne Ave., Indiana, Pa.*

Myron G. Doll, (Chemical). Chem. Engr. for Globe Soap Co., Cincinnati, O., '05. *121 W. 9th St., Cincinnati, O.*

Gerard C. Dodge, (Civil). Asst. Instr. in Surveying, U. of M., Summer of '04. Asst. in Water Gas Dept., Laclede Gas Light Co., St. Louis, Mo., '04-5. Asst. to Benjamin Thompson, Consulting Engr., '05 to date. *317 Fannin St., Chattanooga, Tenn.*

Harry P. Drake, (Civil). With U. S. Gov't. Engrs., Panama Canal, '04-5. *Matachin, Canal Zone, Panama.*

Allan T. Dusenbury, (Mechanical). With Advance Pump & Compressor Co., '04 to date. *101 Garrison Ave., Battle Creek, Mich.*

Frank C. Emerson, (Civil). Asst. City Engr., Saginaw, Mich., '04. Private practice in Irrigation Eng'g at Cora, Wyo., since Sept. 1st, '04. *Cora, Fremont Co., Wyo.*

John E. Evans, (Civil). Instrumentman, Mich. Central R. R. Co., '04 to date. *413 Maple St., Ypsilanti, Mich.*

Earl A. Finkbeiner, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *524 E. 2nd St., Dayton, O.*

Alfred C. Finney, (Electrical). Grad. Mem. U. of M. Eng. Soc. Student Mem. Am. Inst. E. E. With Oak Park Yaryan Co., '04-5. Testing Dept., Gen'l Elect. Co., Schenectady, N. Y., May '05 to date. *418 So. Boulevard, Oak Park, Ill.*

Robert S. Fleshiem, (Electrical). Student Mem. Am. Inst. E. E. Apprentice, Bullock Elect. Mfg. Co., '04 to date. *4278 Ashland Ave., Norwood, O.*

Earl A. Forkner, (Electrical). With Western Elect. Co., Chicago. *3758 Ellis Ave., Chicago, Ill.*

David R. Fraser, Jr., (Mechanical). Machinist, Power & Mining Mach. Co., at Cudahy, '04. In Experimental Dept., do., '04 to date. *462 Van Buren St., Milwaukee, Wis.*

Charles A. Fuller, (Mechanical). Dftsman, Murphy Iron Wks., '04-5. Dftsman, Great Lakes Eng. Wks., '05 to date. *150 Bethune St., E., Detroit, Mich.*

Thomas G. Gale, (Mechanical). In lumber business with the Gale Lumber Co., since graduation. *West Branch, Mich.*

John A. Garrett, (Mechanical). With Fairbanks, Morse & Co., Beloit, '04. Exhibit Engr., Lewis & Clark Exposition, Portland, Ore., '05.

George W. Gilkey, (Mechanical). With the Michigan Paper Co., since graduation. *Plainwell, Mich.*

Herbert S. Graver, (Civil). Dftsman, Wm. Graver Tank Wks., '04 to date. *6122 Stewart Ave., Chicago, Ill.*

Arthur C. Green, (Mechanical). Dftsman, Bucyrus Co., '04-5. *Box 24, South Milwaukee, Wis.*

Mark H. Gregg, (Mechanical). M.S., '05. Asst. in M. E., U of M., '04-5. *311 Thompson St., Ann Arbor, Mich.*

BERTRAM V. R. HALL, (Civil). Dftsman, City Engr's Office, Grand Rapids, Mich., '04. Asst. City Engr., Manistee, Mich., '04. Estimator, Converse Bdge. Co., '05.
317 Fannin St., Chattanooga, Tenn.

MORRIS A. HALL, (Mechanical). In charge erection work, shop of Whitehead & Kales Iron Wks., Detroit, '04-5. Chf. Dftsman, office of F. A. Shoemaker, M.E., Buffalo, '05 to date.
234 West Ave., Buffalo, N. Y.

ROLLAND S. HALL, (Civil). Eng'g Aid, Reclamation Service, U. S. Geol. Survey, '04 to date.
C/o U. S. Geological Survey, Pendleton, Ore.

HARRY A. HARRIS, (Electrical). Power Engr., Stromberg-Carlson Tel. Mfg. Co., '04-5. *46 Vick Park "A," Rochester, N. Y.*

MAX P. HEAVENRICH, (Civil). M. U. of M. Eng. Soc. Transit, U. S. Gov't Light House. Dftsman, Canadian Bdge. Co. Dftsman and Erector on Construction Work, Trussed Concrete Steel Co., *25 High St., W., Detroit, Mich.*

EDWARD L. HOGAN, (Electrical and Mechanical). M.S. '05. Graduate Student in Dept. of Eng., U. of M., '04-5. Asst. in Mech. Eng., U. of M., '04-5. *607 E. Huron St., Ann Arbor, Mich.*

WILLIAM M. HOGLE, (Mechanical). M. Mich. Eng. Soc. Dftsman, E. G. Staude, builder and designer special mach., Minneapolis, '04. Do., Olds Motor Works, Lansing, '04-5. Designing Dftsman, Pope, Toledo, '05 to date.
2203 Maplewood St., Toledo, O.

ARTHUR HOLMES, (Mechanical). Jun., Am. Soc. M. E. Experimental Dept., Olds Motor Works, '04 to date.
C/o Olds Motor Works, Detroit, Mich.

HAROLD HOOKER, (Civil). Estimator, J. C. McFarland & Co., '04 to date.
C/o J. C. McFarland & Co., 27th St. and 5th Ave., Chicago, Ill.

SAMUEL HORNER, (Civil).

WILLIAM O. HOUSTON, (Civil). Instrumentman, Mich. Central R. R., '04. Asst. Engr., East Louisiana R. R., '05 to date.
Covington, La.

CORTES JOHNSON, (Civil). Asst. in Civil Eng., Iowa State College, '04 to date. *1003 Burnett St., Ames, Ia.*

CLARENCE L. KELLER, (Electrical). Student Member Am. Inst. E. E. Dftsman, Detroit United Ry., Mech. Dept., '04 to date.
83 Leverette St., Detroit, Mich.

STEWART B. KINGSBURY, (Marine). Goodrich Steamship Line, '04. Racine Boat Co., '04. *Muskegon, Mich.*

LESTER KIRSCHBRAUN, (Chemical). M. Am. Chem. Soc. Asst. Chemist, Union Pacific R. R., '04 to date.
1046 Georgia Ave., Omaha, Nebr.

WALTER F. KNEIP, (Mechanical). Jun., Am. Soc. M. E. Exp. Dept., Olds Motor Works, '04 to date.
321 Concord St., Detroit, Mich.

HARLOW LEWIS, (Civil). Timekeeper, Thompson-Starrett Co., '02-3. Engr., do., '03-4. Supt., do., '04 to date.
60 Massachusetts Ave., N. E., Washington, D. C.

JAMES E. MCAFEE, (Mechanical). Designing and Estimating, Heating and Ventilating Dept., Thompson-Starrett Co., '04-5. Material man on outside constr., do., '05 to date.
1909 I St., N. W., Washington, D. C.

WILLIAM C. MCBAIN, (Mechanical). Jun. Mem. Am. Soc. M. E. Turbine and Gas Engine Tester, General Elect. Co., '04-5. Computor, The William Tod Co.
78 Williamson Ave., Youngstown, O.

HARRYY E. MCDONNELL, (Mechanical). Estimating in Scientific Dept., Newport News Shipbuilding & Dry Oven Co., 6 months.
123 32nd St., Newport News, Va.

FRED M. MCLEAN, (Civil). Insp. Board of Trustees, Commissioner of Water Wks., Cincinnati, O., '04-5. Asst. Engr., Vera Cruz al Pacifico R. R., '05 to date.
Ferrocarril Vera Cruz al Pacifico, Tierra Blanca, Vera Cruz, Mexico.

JOHN R. MANSFIELD, (Mechanical).

WILLIAM J. MATTHEWS, (Civil). Supt. of Constr., Weber Steel-Concrete Chimney Co., Chicago.
6509 Drexxel Ave., Chicago, Ill.

WILLIAM B. MAY, (Civil). M. Univ. of Mich. Eng. Soc. On Field Surveys, Jackson & Suburban Traction Co., '01. Do., Jackson & Battle Creek Traction Co., '01-2. Asst. Engr., Plainwell Power Co., Plainwell, Mich., '02. Resident Engr., Riggs & Sherman Construction Co., Toledo, O., '03. Asst. Chf. Engr., Duluth & Northern Minn. Ry., '04 to date.
Knife River, Minn.

OSCAR F. MEAD, (Electrical).

HUBERT H. MONTAGUE, (Electrical). M. Mich. Eng. Soc. Student, Western Elect. Co., '04-5. *585 Congress St., Chicago, Ill.*

WILLIAM C. MUNDT, (Civil). Transitman, S. F. Roess, City Engr., Oil City, '04-5. *C/o City Engr's. Owce, Oil City, Pa.*

JOHN H. MUSTARD, (Electrical). M. Electric Club. Apprentice, Westinghouse Elect. & Mfg. Co., '04-5.
812 Franklin Ave., Wilkinsburg, Pa.

OSCAR E. OLSON, (Civil).

LEON A. PADDOCK, (Civil). Canadian Bdge. Co.
Walkerville, Ontario.

WALTER B. PERRY, (Mechanical). Dftsman, Gen'l Elect. Co., Lynn, Mass., '04. Curtis Turbine Test., do., '04-5. Special Machine Shop Apprentice, The Wm. Tod Co., '05 to date.
78 Williamson Ave., Youngstown, O.

WILLIAM E. POST, (Marine). Dftsman, Great Lakes Eng. Wks., Hull Dept., '04 to date. *310 Vinewood Ave., Detroit, Mich.*

Jesse T. Pratt, (Mechanical). Machine Designing, L. A. Pratt, '04, to date. *415 Grant Place, Bay City, Mich.*

Harris P. Ralston, A.B. (Chemical). Dftsman, The Solvay Process Co., '04-5. Foreman of Elect. Dept., do., '05 to date. *533 Woodward Ave., Detroit, Mich.*

Birtram W. Ranson, (Civil). With Am. Bdge. Co., Toledo, O. *1012 Huron St., Toledo, O.*

Lewis C. Rogers, (Mechanical). M. Detroit Eng. Soc. Testing Engr., The Solvay Process Co., '04 to date. *The Solvay Process Co., Detroit, Mich.*

Sydney R. Russel, (Mechanical). Dftsman, Great Lakes Eng. Wks., '05 to date. *863 Jefferson Ave., Detroit, Mich.*

John W. Seens, (Civil). M. Detroit Eng. Soc. Dftsman, Canadian Bdge. Co., Walkerville, Ont., '04 to date. *1225 Jefferson Ave., Detroit, Mich.*

William Seymour, (Chemical). Chemist, Grand Rapids Gas Light Co., 6 months. *275 Sheldon St., Grand Rapids, Mich.*

Carl H. Smith, (Civil). Student and County Sec., Michigan Y. M. C. A. *302 Townsend St., Lansing, Mich.*

Morris H. Stimson, (Mechanical). M. Univ. of Mich. Eng. Soc. Apprentice Am. Radiator Co., Detroit, '04-5. *533 Woodward Ave., Detroit, Mich.*

Walter P. Stine, (Civil). Rodman on Panama Canal, o'4. Levelman, do., '04-5. Asst. Engr., Republic of Panama., '05 to date. *Chitre, Republic of Panama.*

Charles R. Swineford, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *524 East 2nd St., Dayton, O.*

Juan F. R. Tecson, (Civil).

George G. Thompson, (Electrical). Machinist, Olds Motor Wks., '04. Asst. Power Dept., Edison Illum'g Co., '04-5. Dftsman, F. F. Van Tuyl, '05 to date. *59 Park St., Detroit, Mich.*

Robert R. Thomson, (Mechanical). Testing Dept., General Elect. Co., '04 to date. *3 N. College St., Schenectady, N. Y.*

John S. Tyler, (Mechanical). Special Apprentice, P. C. C. & St. L. R. R. *160 N. 20th St., Columbus, O.*

Ralph A. Vail, (Mechanical). Experimental Dept., Olds Motor Wks. *1225 Jefferson Ave., Detroit, Mich.*

John M. Van Splunter, (Electrical). With Allington & Co., Heating and Ventilating Engrs. *Saginaw, Mich.*

Oswald W. Visscher, (Electrical). A.B. (Hope) '01. A.B. (U. of M.) '03. Student, Western Elect. Co., '04-5. *585 Congress St., Chicago, Ill.*

Donald C. Waite, (Civil). Jun. Mem. Am. Soc. C. E. Rodman, Interborough Rapid Transit Co., of New York City, '04 to date. *17 Greenvale Ave., Yonkers, N. Y.*

William T. Walker, Jr., (Mechanical and Electrical). M. Toledo Soc. of Engrs. Dftsman, F. F. Van Tuyl, Detroit. Mngr. Branch Office, Toledo, '04-5. *719 Spitzer Bldg., Toledo, O.*

Otto C. Walther, (Electrical). Testing Dept., General Elect. Co. *Schenectady, N. Y.*

Edward N. Walton, (Mechanical). Engine Testing, Fairbanks, Morse & Co., '04-5. *1049 Church St., Beloit, Wis.*

Charles A. Waring, (Mechanical). Kenneth Anderson Mfg. Co., Detroit. *Detroit, Mich.*

Edward A. Weiland, (Mechanical and Electrical). Dftsman, Solvay Process Co., '04-5. Asst. Chf. Dftsman, do., '05 to date. *19 Cottrell Ave., Delray, Mich.*

Alfred H. White, A.B. M. Am. Chem. Soc. M. Soc. of Chem. Industry. M. Mich. Gas Ass'n. Asst. Professor of Chem. Technology, U. of M., '04 to date. *1017 Hill St., Ann Arbor, Mich.*

John A. Whiting, (Civil). Field Asst. State Engr. of Wyo., Summer '04. Engaged in private practice since. *501 E. 18th St., Cheyenne, Wyo.*

Carlos A. Williston, (Civil).

Vernon C. Wood, (Marine). Dftsman, Manitowoc Dry Dock Co., '04 to date. *702 Park St., Manitowoc, Wis.*

Jesse C. Wright, (Civil).

Arton E. Yokom, (Civil). Rodman, Panama Canal, '04-5. Levelman, do., '05 to date. *Gladstone, Mich.*

Index to Register of Alumni

NAME	CLASS	PAGE
Abel, W. S.	1878	140
Adler, A. K.	1894	164
Aikine, O. H.	1877	140
Alexander, H. B.	1869	130
Allen, D. C.	1876	139
Allen, J. R.	1892	158
Allen, W. H., Jr.	1904	200
Allmendinger, G. F.	1878	141
Allor, E. L.	1892	158
Ames, R. L.	1894	164
Anderson, E.	1899	184
Anderson, F.	1890	154
Anderson, L. D.	1901	191
Anderson, L. W.	1895	167
Arey, A. L.	1875	137
Arey, C. O.	1878	141
Arizpe, E.	1901	191
Armstrong, A.	1902	193
Armstrong, J. C.	1899	184
Arnold, E. B.	1904	200
Arnold, F. E.	1899	184
Artiaga, S.	1904	200
Atkins, C. G.	1893	160
Atwell, H. H.	1903	195
Austin, W. M.	1895	167
Ayers, J.	1880	143
Ayers, N. B.	1899	184
Bachtel, B. W.	1904	200
Baggott, C. W.	1898	180
Bailey, B. F.	1898	180
Baillie, F. S.	1890	154
Bain, F. M.	1868	129
Baker, F. J.	1887	148
Baker, F. L.	1897	177
Baker, H. W.	1877	140
Baker, L.	1875	137
Baker, W. P.	1899	184
Baldwin, A. E.	1871	133
Baldwin, C. C.	1875	137
Baldwin, H.	1893	160
Baldwin, W. S.	1901	191
Ball, W. D.	1890	154
Barada, J. G.	1903	195
Barber, M. H.	1903	195
Barnard, H.	1874	136
Barnes, M. G.	1896	171
Barnum, T. E.	1892	158
Barr, F. C.	1898	180
Barrett, A. M.	1902	193
Barrett, W. A.	1904	200
Bary, M.	1897	177
Bates, H. D.	1875	138
Bartlett, J. R.	1904	200
Bassett, W.	1892	158
Bauer, E.	1885	146
Beach, F. P.	1898	180
Beach, R. W.	1886	147
Beadle, C. S.	1879	142
Bean, C. O.	1874	136
Beattie, M. B.	1900	188
Beaumont, J. A.	1880	143
Beaumont, S. F.	1880	143
Becker, A. J.	1903	195
Becker, A. L.	1894	165
Beckstrand, E. H.	1900	188
Bellows, C. F.	1864	126
Benedict, E. L.	1901	191
Bennett, A. H.	1902	193
Bennett, J. W. F.	1899	184
Benson, A. R.	1890	154
Bentley, C.	1900	188
Benton, H. W.	1903	195
Benzenberg, G. H.	1867	128
Bergbom, F. A.	1900	188
Bibbins, J. R.	1899	184
Bickel, W. F.	1903	196
Biggs, A. P.	1903	196
Biggs, C.	1904	200
Billings, W. G.	1895	167
Bird, J. C.	1894	165
Bird, J. S.	1870	131
Birdsall, A. W.	1897	177
Birdsall, B. Jr.	1875	138
Blackinton, G. W.	1904	200
Blackwood, J. Y.	1893	160
Blaess, A.	1895	167
Blair, J.	1894	165
Blanchard, M.	1898	180
Bliss, F. E.	1873	135
Boomhower, F. H.	1898	180
Borst, F. C.	1898	180
Borst, W. C.	1896	172
Boss, C. M.	1870	131
Boughton, W. H.	1893	160
Bourquin, J. F.	1904	200
Bouton, W.	1865	127
Bowen, B. B.	1886	149
Boyer, A. P.	1871	133
Bradley, F. N.	1900	188
Bradshaw, G. D.	1904	200
Bragg, T. A.	1898	180
Brandon, G. R.	1891	156
Brenton, W. H.	1883	144
Brewer, E. S.	1904	200
Britten, D. A.	1897	177
Britton, H.	1902	193
Broadman, W. H.	1869	130
Brooks, C. W.	1902	193
Brown, C. C.	1879	142
Brown, G. A.	1881	143

NAME	CLASS	PAGE
Brown, I. J.	1898	180
Brown, R. W.	1881	143
Brown, R. W.	1898	180
Brush, C. F.	1869	130
Buckingham, C. L.	1875	138
Buell, H. C.	1896	172
Burdick, F. H.	1897	177
Burgan, A. L.	1895	167
Burnett, H. D.	1884	145
Burns, E. C.	1868	129
Burnstine, A.	1888	150
Burr, J. D.	1871	133
Bursley, J. A.	1899	184
Burt, H. G.	1872	134
Burton, W.	1877	140
Busch, J. W.	1900	188
Bush, P. R.	1895	168
Byers, J. W.	1898	180
Cahill, W. J.	1896	172
Caldwell, J. O.	1876	139
Caldwell, W. A.	1896	172
Caldwell, W. R.	1895	168
Calkins, A. S.	1891	156
Callard, J. L.	1884	145
Campau, M. W.	1897	177
Campbell, V. C.	1904	200
Campbell, W. W.	1886	147
Carnefix, C. A.	1875	138
Carpenter, H. W.	1901	191
Carpenter, I. D.	1892	158
Carpenter, R. C.	1875	138
Castilla, D. F.	1899	184
Chaffee, B. R.	1868	129
Chaffee, W. N.	1902	193
Channon, H. O.	1893	160
Chapin, L. E.	1883	145
Chapman, W. H.	1901	191
Cheever, D. B.	1891	156
Cheever, M.	1903	196
Cheever, P.	1900	188
Cheney, E. H.	1892	158
Chesebrough, W. G.	1899	184
Chester, C. P.	1903	196
Chickering, H. E.	1894	165
Chickering, W. W.	1895	168
Chipman, G. H.	1883	145
Clark, A. L.	1893	161
Clark, A. P.	1903	196
Clark, C. H.	1901	191
Clark, H. W.	1894	165
Clark, W. G.	1884	145
Clary, D. H.	1904	200
Clary, E. D.	1885	146
Clay, B. J.	1868	129
Clemens, H. J.	1904	200
Cleverdon, C. C.	1900	188
Clift, J. W.	1899	185
Clute, H. L.	1903	196
Coates, P. R.	1896	172
Cobb, S. P.	1901	191
Cochran, J. K.	1904	200
Colburn, B. S.	1896	172
Collamore, R.	1897	177
Collins, E.	1897	177
Conable, E. W.	1899	185
Conant, W. C.	1894	165
Condon, J. C.	1896	172
Conklin, J. I.	1896	172
Conner, M. S.	1896	172
Conover, C. V.	1902	193
Conrad, E. B.	1890	154
Cook, C. O.	1898	181
Cook, W. G.	1904	200
Cooke, C. S.	1894	165
Coolidge, E. B.	1898	181
Coolidge, S. B.	1898	181
Cooper, W. M.	1899	185
Coryell, W. C.	1896	172
Cotter, C. T.	1904	200
Cottingham, C.	1897	177
Coulter, L. P.	1898	181
Cowgill, J. S.	1898	181
Cox, H. M.	1895	168
Cramer, S.	1887	149
Crampton, F. F.	1898	181
Crocker, F. M.	1889	152
Crocker, H. S.	1889	152
Crosby, J. M.	1891	156
Culley, J. L.	1870	131
Cunningham, G. A.	1904	200
Currer, W. J.	1893	161
Curtis, W. T.	1899	185
Cutcheon, F. R.	1896	172
Damon, G. A.	1895	168
Daniels, H. W.	1898	181
Darling, J. H.	1873	135
Darrow, E.	1892	158
Davidson, J. V.	1903	196
Davila, J.	1900	188
Davis, C. B.	1901	191
Davis, E. S.	1880	143
Davis, F. C.	1888	150
Davis, F. P.	1876	139
Davis, J. B.	1868	129
Davis, J. C.	1893	161
Davock, H. P.	1870	131
Demrick, A. H.	1894	165
Denman, B. J.	1899	185
De Puy, C. E.	1891	156
Detwiler, W. A.	1902	193
De Young, I.	1898	181
De Young, R.	1903	196
Dickey, J. L.	1902	194
Dickinson, B. C.	1899	185
Dickinson, H. H.	1900	188
Dickinson, L. L.	1875	138
Dickson, J. H.	1895	168
Dixon, C. Y.	1887	149
Dolbear, A. E.	1867	128
Doll, M. G.	1904	201
Dolph, W. J.	1903	196
Donaldson, L. C.	1876	139
Donovan, C.	1872	134
Donovan, W.	1865	127
Dooge, G. C.	1904	201
Doolittle, C. L.	1874	136

NAME	CLASS	PAGE
Dorrance, W. H.	1893	161
Dorst, J. W.	1881	143
Douglas, B.	1882	144
Douglas, H. W.	1890	154
Drake, H. P.	1904	201
Dratz, P. A.	1900	188
Dressel, J. H.	1899	185
Drew, W. S.	1897	177
Dudley, A. M.	1902	194
Dunbar, J. H.	1895	168
Duncan, J. D. E.	1893	161
Dunham, L. E.	1886	147
Dunlap, F. M.	1883	145
Dunning, G. H.	1803	161
Dunning, I. S.	1863	126
Durkee, H. R.	1868	129
Dusenbury, A. T.	1904	201
Du Shane, I. D.	1878	141
Dye, J. H.	1895	168
Eaton, J. C.	1875	138
Eckert, F. A.	1896	173
Eddy, C. M.	1896	173
Edgar, M. W.	1882	144
Edmonds, J. D.	1896	173
Eggert, G. B.	1901	191
Ehrman, E. H.	1888	150
Eisenmann, J.	1871	133
Ellis, C. W.	1896	173
Ellsworth, E. M	1897	177
Emerson, F. C.	1904	201
Emerson, J. O.	1903	196
Emery, T.	1873	135
Entrekin, T.	1868	129
Epple, E. A.	1903	196
Evans, J. E.	1904	201
Everett, A. F.	1898	181
Everett, J. M.	1874	136
Ewing, R. D.	1896	173
Eymer, H.	1894	165
Farnham, T. L.	1897	177
Faurote, F. L.	1903	196
Fechheimer, S. M.	1903	196
Felver, H.	1898	181
Ferdon, E. J.	1873	135
Fenkell, N. C.	1903	196
Ferguson, D. McH.	1903	196
Ferguson, L. E.	1870	132
Ferguson, T. H.	1896	173
Field, H. G.	1893	161
Finkbeiner, E. A.	1904	201
Finney, A. C.	1904	201
Finney, H. R.	1903	197
Fisher, C. A.	1880	155
Fisher, D. G.	1900	188
Fisher, G. L.	1880	143
Fisher, W. J.	1893	161
Fitch, A. C.	1903	197
Fitz Gerald, J. W.	1896	173
Flagg, J. H.	1872	134
Fleshiem, R. S.	1904	201
Flint, A. R.	1866	127
Follett, W. W.	1881	143
Foote, L.	1866	127
Forkner, E. A.	1904	201
Foster, B. L.	1896	173
Fox, O. O.	1869	130
Fox, R. M.	1898	181
Frantzen, A.	1892	159
Fraser, D. R.	1904	201
Freeman, M. H.	1903	197
Freitag, J. K.	1890	155
French, H. E.	1894	165
Frink, F. G.	1886	147
Fucik, F. A.	1898	181
Fuller, C. A.	1904	201
Fulton, J. A.	1871	133
Fyan, W. J.	1903	197
Gale, T. G.	1904	201
Gardiner, P. S.	1893	161
Garrett, J. A.	1904	201
Gastman, W. E.	1890	155
Gavett, G. I.	1893	162
Geismer, H.	1897	177
Gemmell, R. C.	1884	146
Gibson, G. H.	1899	185
Gibson, P. S.	1861	125
Gilbert, C. P.	1870	132
Gilbert, M. A.	1897	177
Gilchrist, F. R.	1893	162
Gilkerson, H. G.	1895	168
Gilkey, G. W.	1904	201
Gillen, F. F.	1898	187
Gillespie, J. L.	1872	134
Goddard, L. W.	1886	147
Goldsmith, L.	1898	181
Goodman, L. A.	1867	128
Goodrich, E. P.	1898	181
Goodrich, R. D.	1903	197
Goulding, H. J.	1893	162
Grabenstein, A.	1900	188
Grace, S. P.	1896	173
Gram, L. M.	1901	191
Grant, E. W.	1875	138
Grant, G. Jr.	1903	197
Graver, H. S.	1904	201
Green, A. C.	1904	201
Green, B. L.	1891	156
Green, F. M.	1898	182
Greene, A. E.	1896	173
Gregg, M. H.	1904	201
Greulich, O.	1894	165
Groesbeck, L. M.	1893	162
Grove, W. V.	1878	141
Guernsey, F. W.	1873	136
Guillotte, D. M.	1896	173
Gustin, R. P.	1895	168
Hall, B. V. R.	1904	202
Hall, M. A.	1904	202
Hall, R. M.	1902	194
Hall, R. S.	1904	202
Halsted, J.	1887	149
Hamilton, C. H.	1869	130
Hamilton, P.	1896	174
Hammond, J. C.	1894	166
Hamper, H. D.	1894	166
Hand, W. R.	1887	149

NAME	CLASS	PAGE
Hanson, J. K.	1878	141
Harmon, C. J.	1894	166
Harrington, G. H.	1896	174
Harrington, H. E.	1898	182
Harris, A. L.	1898	182
Harris, Harmon A.	1899	185
Harris, Harry A.	1904	202
Harris, J. B.	1903	197
Harris, S. F.	1899	185
Harrison, H. T.	1897	177
Harting, H. D.	1900	188
Hartman, M. C.	1899	185
Harvey, L. R. M.	1898	182
Hatch, H. J.	1891	157
Hatch, J. N.	1892	159
Hathaway, J. E.	1881	143
Haubrick, A. M.	1895	168
Havens, M. K.	1868	129
Hayes, W. B.	1890	155
Hayler, G. Jr.	1894	166
Hayward, J. A.	1870	132
Hazelton, W. S.	1902	194
Head, W. J.	1873	136
Heavenrich, M. P.	1904	202
Heffelbower, O. E.	1899	186
Hegeler, J. W.	1889	152
Hegeler, Mary (Mrs. Paul Carus)	1882	144
Henning, C. S.	1879	142
Henninger, F. W.	1897	177
Henry, G. P.	1901	191
Hess, K. W.	1887	149
Hetzler, H. G.	1886	148
Hibbard, J. D.	1887	149
Hildner, L. F. W.	1893	162
Hill, A.	1865	127
Hill, C. D.	1880	143
Hill, G. S.	1901	191
Hill, L. C.	1886	148
Himes, W. H.	1903	197
Hinchman, T. H.	1893	162
Hinkson, W. J.	1891	157
Hixson, C. J.	1899	186
Hoadley, J. S.	1896	174
Hoag, S. A.	1903	197
Hodge, G. B.	1887	149
Hodge, J. E.	1888	150
Hogan, E. L.	1904	202
Hogle, W. M.	1904	202
Holcomb, A. E.	1901	191
Holdsworth, P. M.	1898	182
Holliday, J. C.	1869	130
Holmes, A.	1904	202
Holmes, H.	1874	136
Holmes, J. S. H.	1893	162
Hooker, H.	1904	202
Hookway, A. W.	1893	162
Hoover, D. E.	1881	144
Hoover, F. R.	1899	186
Hoover, J. W.	1875	138
Hopkins, F. M.	1902	194
Hornberger, W. C.	1901	191
Horner, S.	1904	202
Horth, J. L.	1899	186
Horton, B. D.	1895	168
Horton, R. F.	1901	192
House, E. B.	1896	174
Houston, W. O.	1904	202
Howard, C. W.	1903	197
Howden, H.	1893	162
Howell, C. A.	1892	159
Howlett, L. G.	1899	186
Hoyt, E. D.	1896	176
Hoyt, J. T. N.	1891	157
Hubbell, C. W.	1893	162
Hudnutt, G. D.	1901	192
Hughes, E. A.	1899	186
Hull, J. S.	1874	136
Hull, M. W.	1893	162
Hulst, J.	1895	169
Huntoon, M. B.	1805	169
Hussey, W. J.	1889	152
Hutchins, H. C.	1903	197
Hutchinson, L.	1897	177
Imhof, H.	1902	194
Irwin, J. W.	1896	174
Ives, V. S.	1893	162
Jackson, H. B.	1874	137
Jackson, H. C.	1896	174
Jackson, R. B.	1902	194
Jackson, R. P.	1902	194
Jacobs, E. H.	1900	189
Jaycox, J. M.	1887	149
Jenison, E. S.	1868	129
Johnson, A.	1866	127
Johnson, C.	1904	202
Johnson, H. F.	1902	194
Johnson, J. B.	1878	141
Johnston, C. T.	1895	169
Johnston, E. S.	1868	129
Johnston, L. F.	1900	189
Johnstone, W. M.	1892	159
Jones, C. D.	1893	162
Josenhans, T.	1878	141
Joseph, O. G.	1900	189
Judd, H. W.	1878	141
Judson, L. P.	1867	128
Kahn, J.	1896	174
Kalmbach, A. L.	1896	174
Kastl, A. E.	1885	146
Keating, W. T.	1891	157
Keeler, F. L.	1893	162
Keeney, H. B.	1903	197
Keller, C. L.	1904	202
Kelly, H. B.	1896	174
Kempf, J. R.	1890	155
Keyes, J. P.	1892	159
Khuen, R. Jr.	1889	152
Kiefer, E. W.	1901	192
Kiehle, J. W.	1903	197
Kimmel, W. L.	1899	186
King, B. D.	1879	142
King, H. W.	1895	169
King, W. C.	1886	148
Kingsbury, S. B.	1904	202
Kinne, E. P.	1902	194

NAME	CLASS	PAGE
Kintner, C. J.	1870	132
Kirschbraun, L.	1904	202
Kittleman, W. W. Jr.	1901	192
Kittredge, C.	1897	177
Klotz, O. J.	1872	134
Kneip, W. F.	1904	202
Knight, A. H.	1900	189
Knight, E. K.	1903	197
Knight, H. V.	1895	169
Knox, S. K.	1903	197
Krause, F.	1860	125
Krause, O. A.	1900	189
Kremers, R. E.	1900	189
La Fever, C. A.	1899	186
Lafler, W. A.	1903	197
Lake, G. B.	1869	130
Lamont, G. T.	1896	174
Lamont, R. P.	1891	157
Lancashire, F. H.	1902	194
Lane, C. H.	1885	146
Lane, V. H.	1874	137
Larrabee, W. B.	1892	159
Lederle, G. A.	1881	144
Lee, T. B.	1896	174
Leefe, F. E.	1901	192
Leeson, C. G.	1901	192
Le Favour, D.	1895	169
Lehnartz, W.	1900	189
Leland, O. M.	1900	189
Leonard, H. B.	1895	169
Lewerenz, A. C.	1892	159
Lewis, H.	1904	203
Lewis, H. W.	1866	127
Lewis, J. A.	1888	150
Lewis, J. G.	1897	178
Lichtenstein, M.	1894	166
Lilly, G. W.	1881	144
Linabury, J. E.	1902	194
Lindau, A. E.	1900	189
Liskow, B. H.	1901	192
Littlefield, J. L.	1871	133
Livingstone, W. A.	1889	152
Lodewyck, A. G.	1903	197
Loeffler, E. T.	1886	146
Loomis, C. B.	1900	189
Louckes, F. I.	1903	197
Loud, F. H.	1900	189
Lunn, E.	1899	186
Lunn, G. W.	1900	189
Loughnane, G.	1887	149
Loveridge, F. H.	1889	152
Lungren, C. M.	1874	137
Luten, D. B.	1894	166
Lyman, R. R.	1895	169
Lyon, E. D.	1897	178
Lyster, T. L. B.	1901	192
McAfee, J. E.	1904	203
McAllaster, E. L.	1889	153
McBain, W. C.	1904	203
McCloy, R. R.	1902	194
McColl, T. D.	1896	174
McCrickett, T. F.	1897	178
McDonald, B.	1886	148
McDonnell, H. E.	1904	203
McDougall, A. H.	1901	192
McEwan, W. H.	1882	144
McGee, G. T.	1896	175
MacGregor, W.	1901	192
McHarg, W. S.	1868	129
McKee, W. M.	1899	186
McKenzie, D.	1865	127
McLean, F. M.	1904	203
McLean, H. A.	1900	190
McMullen, G. K.	1896	175
MacNaughton, G. D.	1901	192
McNeil, M. C.	1902	194
Mahon, R. L'H.	1888	150
Mann, E. S.	1878	141
Manning, R. G.	1890	155
Mansfield, J. R.	1904	203
Mansfield, R. J.	1900	189
Marquardt, C. R.	1896	175
Marr, G. A.	1863	126
Marsh, D. E.	1903	197
Marsh, E. P.	1898	182
Marsh, H. S.	1900	190
Marshall, A. C.	1893	163
Marshall, C. A.	1876	140
Martin, P. W.	1902	194
Martin, W. F.	1897	178
Mason, C. S.	1896	175
Mason, L.	1871	133
Matthews. W. J.	1904	203
Mathewson, T. K.	1895	169
Matsuyama, S.	1900	190
Maurice, W. B.	1900	190
May, E. S. C.	1890	155
May, W. B.	1904	203
Mayworm, A. J.	1899	186
Mead, E. B.	1900	190
Mead, O. F.	1904	203
Melchers, W. J.	1895	169
Mendenhall, W.	1863	126
Merrick, H. B.	1898	182
Merrill, H. W.	1896	175
Merrill, R. H.	1902	195
Meyendorff, M. A.	1870	132
Mickle, G. W.	1870	132
Miggett, W. L.	1899	186
Milburn, H. M.	1903	198
Miller, G. H.	1893	163
Miller, W. C.	1881	144
Miller, W. C.	1900	190
Mills, H. Y.	1896	175
Miner, C. A.	1895	169
Minto, W.	1860	125
Mitchell, J. A.	1872	134
Montague, H. H.	1904	203
Montgomery, J. H.	1897	178
Moody, H. A.	1898	182
Moore, H. E.	1897	178
Morehouse, L. F.	1897	178
Morgan, W. B.	1863	126
Moritz, C. J. H.	1897	178
Morley, F.	1886	148
Morley, H. T.	1879	142

NAME	CLASS	PAGE
Morley, W. R.	1903	198
Morrison, J. H.	1875	139
Morse, C. H.. Jr.	1895	170
Morse, S. T.	1878	141
Morsman, J. J.	1893	163
Morton, R. H.	1903	198
Moses, J. C.	1887	149
Moses, W. V.	1889	153
Mott, A. D.	1892	159
Mountain, J. T.	1899	186
Muir, W. H.	1888	150
Mundt, W. C.	1904	203
Murphy, E. J.	1891	157
Mustard, J. H.	1904	203
Myers, R. M.	1901	192
Neff, E. H.	1890	155
Nelson, J. B.	1890	155
Nelles, F. N.	1900	190
Newell, A. C.	1892	159
Newell, F. W.	1898	182
Neumann, W. F. V.	1897	178
Newton, A. L.	1901	192
Newton, C. G.	1898	183
Newton, G. D.	1896	175
Newton, L. L.	1896	175
Newton, M. L.	1875	139
Newton, R. W.	1894	166
Nichols, J. F.	1895	170
Nicholson, E.	1895	170
Noble, A.	1870	132
Noble, C. W.	1899	186
Noble, F. C.	1894	166
Norton, A. W.	1900	190
O'Brien, A. P.	1896	175
O'Brien, W. K.	1896	175
Olson, O. E.	1904	203
Otis, H. B.	1896	175
Otis, R. B.	1903	198
Owen, C. F.	1878	141
Paddock, L. A.	1904	203
Page, F. J.	1900	190
Page, V. L.	1903	198
Palmer, C. G.	1896	175
Palmer, R. K.	1894	166
Pantlind, G. E.	1875	139
Parker, J. C.	1901	192
Parker, Marian S.	1895	170
Parker, W. P.	1894	166
Parker, W. R.	1888	150
Parmenter, F. S.	1903	198
Parrott, L. M.	1896	175
Parshall, A. J.	1871	133
Parsons, E. I.	1875	139
Passolt, A. S.	1895.	170
Payne, J. W.	1883	145
Pease, W. H.	1888	151
Pelham, F. B.	1887	149
Pennington, B. H.	1871	133
Perkins, J. W.	1873	136
Perrien, J.	1897	178
Perry, C. H.	1895	170
Perry, E. B.	1889	153
Perry, E. D.	1871	133
Perry, T. O.	1872	135
Perry, W. B.	1904	203
Pettersch, J. H.	1898	183
Philbrick, P. H.	1868	129
Pierce, M.	1903	198
Polglase, D. E.	1903	198
Pomeroy, L. S.	1893	163
Pond, I. K.	1879	142
Poore, C.	1868	129
Pope, W.	1888	151
Porter, M. E.	1893	163
Post, W. E.	1904	203
Potter, E. F.	1903	198
Potter, W. H.	1875	139
Pratt, C.	1871	133
Pratt, G. C.	1897	178
Pratt, J. T.	1904	204
Pratt, K. H.	1903	198
Pruessman, A.	1902	195
Pruessman, O.	1898	183
Prout, H. G.	1871	133
Purcell, F. C.	1903	198
Quinn, R.	1894	167
Quintus, J. C.	1879	142
Rademacher, F. M.	1903	198
Rademacher, H. A.	1903	198
Radford, W. H.	1903	198
Raikes, J. M.	1896	175
Ralston, H. P.	1904	204
Rannells, C. J.	1900	190
Ranson, B. W.	1904	204
Ravenscroft, E. H.	1898	183
Raymond, A. B.	1871	134
Raymond, H. M.	1893	163
Raynor, C. W.	1898	183
Reeves, R. J.	1868	129
Reid, E. S.	1893	163
Remington, J. W.	1866	127
Rhodes, D. H.	1869	130
Rich, B. C.	1896	175
Rich, E. P.	1903	198
Richards, B. C.	1877	140
Richardson, A. E.	1899	187
Richardson, A. H.	1901	192
Richardson, P. H.	1888	151
Richmond, F. S.	1891	157
Ripley, H. C.	1870	132
Ripley, J.	1876	140
Rippey, W. H.	1897	179
Rising, W. R.	1867	128
Robbins, W.	1896	175
Roberts, F. C.	1897	174
Roberts, O.	1894	167
Roberts, S. E.	1895	170
Roberts, W.	1899	187
Robinson, A. A.	1869	130
Robinson, S. W.	1863	126
Rodman, H.	1893	163
Roehl, C. E.	1888	151
Roehm, G.	1887	149
Rogers, F. A.	1894	167
Rogers, L. C.	1904	204
Rohnert, B.	1887	150

NAME	CLASS	PAGE
Roosevelt, R. M.	1902	195
Root, E. D.	1875	139
Rosen, D. N.	1899	187
Rosencrans, E. J.	1893	163
Rosing, A. S.	1900	190
Ross, J.	1903	198
Rounds, W. P.	1889	153
Rowe, G. H.	1891	157
Rummler, E. A.	1901	192
Rumsey, J. L.	1874	137
Runge, R. W.	1900	190
Runner, M. L.	1903	198
Rusche, J. P.	1888	151
Russel, H. L.	1898	183
Russel, S. R.	1904	204
Russel, W. S.	1875	139
Ryan, E.	1888	151
Ryan, E. J.	1896	176
Ryan, W. R.	1903	199
Sabin, L. C.	1890	156
Sack, R. E.	1896	176
Sackett, H. M.	1889	153
Sackett, R. L.	1891	157
Sager, F. A.	1894	167
St. Clair, J. T.	1898	183
St. John, A. G.	1899	187
St. John, E. M.	1895	171
St. John, H. L.	1903	199
Salter, W. G.	1895	170
Samuel, G. F.	1885	147
Sanders, J. D.	1876	140
Sanderson, J.	1878	141
Satterlee, F. P.	1880	143
Savage, F. N.	1898	183
Schaake, W.	1895	170
Schaeberle, E. A.	1903	199
Schaeberle, J. M.	1876	140
Schairer, O. S.	1902	195
Schuett, A. H.	1903	199
Scott, E.	1895	170
Seabolt, F. J.	1897	179
Seas, L. E.	1901	193
Sedgwick, H. W.	1900	190
Seeley, T. J.	1869	131
Seens, J. W.	1904	204
Seery, R. C.	1903	199
Seymour, G. H.	1861	126
Seymour, W.	1904	204
Seymour, W. W.	1902	159
Shankland, R. M.	1888	151
Shaw, L.	1901	193
Shaw, W. D.	1902	195
Shenk, F. D.	1903	199
Shepard, J. C.	1876	140
Shoemaker, L. H.	1889	153
Shotwell, J. W.	1888	151
Simonds, C. G.	1897	179
Simonds, O. C.	1878	141
Simpson, G. R.	1886	148
Sims, S.	1903	199
Sinclair, J. A.	1887	150
Sizer, F. L.	1878	141
Skinner, F. G.	1895	171
Small, W.	1897	179
Smith, A. H.	1892	160
Smith, C. C.	1871	134
Smith, C. C.	1886	148
Smith, C. H.	1904	204
Smith, E. M.	1892	160
Smith, F. C.	1889	153
Smith, F. M.	1868	129
Smith, L. B.	1898	183
Smith, W. S.	1894	167
Snover, C. M. C.	1866	128
Snover, E. J.	1877	140
Soper, F. C.	1896	176
Spalding, E. M.	1872	135
Spence, D. W.	1891	157
Spencer, C. H.	1896	176
Sprague, E. M.	1888	151
Springer, G. B.	1890	156
Sproat, H. J.	1901	193
Squier, C. W.	1898	183
Stanley, L. A.	1895	171
Stannard, G. E.	1889	153
Starr, D. D.	1902	195
Starrett, G.	1894	167
Stebbins, W. T.	1896	176
Steck, E.	1901	193
Steck, R.	1898	183
Steel, J.	1867	128
Steen, I. F.	1895	171
Stenger, E.	1886	148
Stevens, C. M.	1873	136
Stevens, F. C.	1903	199
Stevens, R. C.	1895	171
Stevenson, A. D.	1896	176
Still, H. J.	1888	151
Stimson, M. H.	1904	204
Stine, W. P.	1904	204
Strawn, L. H.	1876	140
Streib, J. F.	1898	183
Streng, J. C.	1884	146
Stroebe, E. C.	1902	195
Struckman, E. G.	1897	179
Stull, O. S.	1889	153
Swan, F. V. V	1896	176
Swift, L.	1869	131
Swineford, C. R.	1904	204
Taft, M. C.	1889	153
Taggart, J. M.	1903	199
Tagge, A. C.	1897	179
Talman, W. W.	1901	193
Tanner, G. W.	1896	176
Tate, W. C.	1895	171
Taylor, W. W.	1893	164
Teeson, J. T. R.	1904	204
Tefft, L. J.	1903	199
Temple, M. F.	1872	135
Temple, W. F.	1903	199
Terrell, C. D.	1899	187
Terry, H. E.	1878	141
Thomas, C. H.	1898	183
Thompson, A.	1867	128
Thompson, G. G.	1904	204
Thompson, W. K.	1896	176

NAME	CLASS	PAGE
Thomson, R. R.	1904	204
Traver, A. F.	1900	190
Treadway, H. P.	1898	183
Treadwell, E.	1869	131
Trevidick, M. S.	1897	179
Trott, F.	1899	187
Tschirgi, M. Jr.	1872	135
Tubbs, N. J.	1895	171
Tullock, A. J.	1876	140
Turtle, J. E.	1877	140
Tuthill, G. C.	1891	157
Tuthill, J.	1883	145
Tyler, J. S.	1904	204
Udell, L. N.	1902	195
Unsold, A. G.	1897	179
Unthank, A. W.	1865	127
Utley, J. A.	1903	199
Vail, R. A.	1904	204
Vandersluis, W. M.	1902	195
Van Deventer, H. F.	1892	160
Van Pelt, E.	1878	142
Van Pelt, S.	1898	184
Van Splunter, J. M.	1904	204
Van Tuyl, F. F.	1895	171
Vaughan, C. K.	1896	176
Vickers, F. E.	1897	179
Visscher, O. W.	1904	204
Vlademiroff, T.	1897	180
Voight, W. Jr.	1873	136
Wagner, F. C.	1885	147
Waite, D. C.	1904	204
Walbridge, E. E.	1888	151
Walker, G. M.	1891	158
Walker, I. O.	1883	145
Walker, S. W.	1871	134
Walker, W. T. Jr.	1904	204
Walser, J. J.	1900	190
Walther, O. C.	1904	205
Walton, E. N.	1904	205
Waring, C. A.	1904	205
Waters, C. M.	1900	190
Waters, W. J.	1870	132
Weare, G. C.	1894	167
Weare, H. C.	1896	176
Weare, J.	1894	167
Webb, J. B.	1871	134
Webber, A. A.	1898	184
Weber, O. L. E.	1893	164
Webster, C. D.	1897	180
Webster, D. W.	1903	199
Weideman, C. H.	1809	187
Weidman, W. R.	1899	187
Weiland, E. A.	1904	205
Weiskopf, S. C.	1882	144
Wells, E. J.	1862	126
Wells, M. J.	1875	139
Wells, M. N.	1868	130
Wenzell, A. J.	1878	142
Wetmore, E. P.	1887	150
Wetmore, J. McM.	1901	193
Wheeler, A. C.	1903	199
Wheeler, E. S.	1867	128
Wheeler, L. L.	1874	137
Wheeler, L. L.	1896	176
Wheeler, O. B.	1862	126
Wherry, H. P.	1903	199
Whitaker, H. E.	1888	151
White, A. H.	1904	205
Whiting, J.	1869	131
Whiting, J. A.	1904	205
Whitman, F. S.	1896	176
Whitman, P. R.	1889	153
Whitney, C. W.	1899	187
Wickes, E. D.	1893	164
Wignt, S. B.	1878	142
Wiley, R. R.	1897	180
Wilber, B. D.	1899	188
Wilbur, F. J.	1900	190
Wilkins, V. P.	1895	171
Wilkinson, T. L.	1891	158
Willcox, G. B.	1895	171
Williams, B.	1869	131
Williams, C. B.	1896	176
Williams, G. S.	1889	154
Williams, H. J.	1888	152
Williams, N. H.	1893	164
Williams, R. E.	1874	137
Willis, J. W.	1873	136
Williston, C. A.	1904	205
Willits, W. C.	1870	133
Willoughby, V. R.	1896	176
Wills, W. L.	1903	199
Wilson, F. C.	1902	195
Wilson, O. S.	1874	137
Winchell, C. M.	1873	136
Windes, F. A.	1893	164
Wines, L. D.	1874	137
Wisner, G. M.	1892	160
Wisner, G. Y.	1865	127
Wolverton, I. M.	1890	156
Wood, A. B.	1899	188
Wood, A. P.	1866	128
Wood, E. F.	1879	143
Wood, F. J.	1902	195
Wood, J. W.	1861	126
Wood, J. W.	1900	190
Wood, M. A.	1898	184
Wood, V. C.	1904	205
Woodard, L. A.	1896	176
Woodard, S. H.	1896	176
Woodmanse, F.	1898	184
Woodruff, E. F.	1896	176
Woods, G. H.	1896	176
Woods, W. H.	1897	180
Woodward, I. C.	1897	180
Woodward, R. S.	1872	135
Woolfenden, H. L.	1896	176
Wrentmore, C. G.	1893	164
Wright, J. C.	1904	205
Wuerfel, G. D.	1900	191
Wyckoff, F. A.	1903	199
Wyckoff, H. W.	1895	171
Yokom, A. E.	1904	205
York, B. S.	1901	193
Young, C. E.	1901	193
Young, J. G.	1900	191
Zealand, T. F. H.	1901	193

General Index

Absent with Excuse, Removal of Record, 59.
Absent without Excuse, Removal of Record, 59.
Academic Year, 13.
Admission:
  Conditional, 24, 58.
  Conditions, Rule Concerning, 58.
  Examinations, Schedule of, 25.
  From Department of Literature, Science, and the Arts, 15.
  Of Candidates for a Degree, 17.
  Of Students not Candidates for a Degree, 23.
  On Diploma, 26.
  Requirements for 1905-1906, 13.
  Requirements that become effective in 1906, 15.
  To Advanced Standing, 21.
Advanced Credit—See Advanced Standing, 215.
Advanced Projections (Drawing 6):
  Course offered in, 71.
  Requirement for Graduation, 96.
  Schedule of, 82.
Advanced Projections and Stereotomy (Drawing 5):
  Course offered in, 71.
  Requirement for Graduation, 95.
  Schedule of, 80, 85, 86.
Advanced Standing:
  Admission to, 21.
  Rules relating to, 22.
Algebra, Requirement for Admission, 19.
Algebra (Mathematics 1):
  Course offered in, 63.
  Description of Work in, 34.
  Requirement for Graduation, 95.
  Schedule of, 79.
Alternating Current Generators (Elect. Engineering 3):
  Course offered in, 76.
  Description of Work in, 43.
  Requirement for Graduation. 96.
  Schedule of. 83, 90, 91.
Alternating Current Motors (Elect. Engineering 4):
  Course offered in, 77.
  Description of Work in, 43.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Alumni, Alphabetical Index of, 207-214.
Alumni Association, Officers of, 123.
Alumni, Register of, 125.
Analytic Geometry (Mathematics 1 and 2):
  Courses offered in, 63.
  Requirement for Graduation, 95.
  Schedule of, 79.
Announcements for 1905-1906, 2.
Approved Schools, 26.
Astronomical Observatory, 53.
Astronomy:
  Courses offered in, 68.
  Description of Work in, 39.
  Requirement for Admission, 21.
Athletic Field—See Facilities for Physical Culture, 55, 56.
Bachelor of Science, Degree of, 94.
Board, Cost of, 28.
Board of Regents, 4.
Botany, Requirement for Admission, 21.
Calculus (Mathematics 3, 4, 5, 6):
  Courses offered in, 63.
  Description of Work in, 34.
  Requirement for Graduation, 95, 96, 97.
  Schedule of, 80-93.
Calendar:
  For 1905-1906. 3.
  University of Michigan, 13.
Candidates for a Degree, Admission of, 17.
Carpenter and Pattern Shop, 48.
Certificates:
  From Approved Schools, 26.
  From Other Schools, 15.
  From Regents of the University of the State of New York, 26.
Chemical Engineer, Degree of, 98.
Chemical Engineering:
  Courses offered in, 77.
  Description of Work in, 12, 35, 43.
  Requirements for Graduation, 95, 96, 97.
Chemical Laboratories, 47.
Chemical Technology (Chemistry 33, 39):
  Courses offered in, 66, 67.
  Requirement for Graduation, 97.
  Schedule of, 83, 92.
Chemistry:
  Courses offered in, 65, 66, 67.
  Description of Work in, 35, 66, 67.
  Entrance deficiency in, 65, 80.
  Requirement for Admission, 21.

  Requirements for Graduation (Courses 2, 3*a*, 3*b*, 5, 7, 28, 33, 35, 38, 39), 95, 97.
  Schedule of (Courses 2, 3*a*, 3*b*, 5, 7, 28, 33, 35, 38, 39), 79–84, 89–93.
Choral Union—See University Organizations, 55.
Civil Authorities, Relation of Students to, 31.
Civil Engineer, Degree of, 98.
Civil Engineering:
  Courses offered in, 73, 74.
  Description of Work in, 37-40.
  Requirement for Graduation (Courses 1, 2, 3, 4, 5, 6, 7), 95.
  Schedule of (Courses 1, 2, 3, 4, 5, 6, 7), 80–91, 93.
Civil Government, Requirement for Admission, 21.
Classification of Students, 57.
Commencement, Date of, 2.
Compressed Air and Refrigeration Mech. Engineering 14):
  Course offered in, 76.
  Description of Work in, 42.
Conditional Admission, 24, 58.
Conditionally Passed, Removal of Record of, 58, 59.
Conditions:
  Removal of Entrance, 15.
  Rules relating to, 58.
Courses Announced for 1905-1906, 60.
Courses of Instruction, 56.
Credit:
  For Advanced Standing, 23.
  For Work done outside of University, 57.
  Hour of, 56.
  To receive, 58.
Deficiencies, How removed, 58, 59.
Deficiency:
  In Chemistry (Entrance). 65, 80.
  In Trigonometry (Entrance), 63, 80.
Degree of:
  Bachelor of Science, 94.
  Master of Science, 97.
  Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Marine Engineer, and Naval Architect, 98.
Degree, Recommendation for, 13.
Department of Literature, Science, and the Arts, Admission from, 15.
Descriptive Geometry (Drawing 4):
  Course offered in, 71.
  Requirement for Graduation, 95.
  Schedule of, 79.
Design of Shop Machinery, 41.
Design of Electrical Machinery (Elect. Engineering 5):
  Course offered in, 76, 77.
  Description of Work in, 43.
  Requirement for Graduation, 96.
  Schedule of, 83, 90.
Designs in Engineering and Machine Construction, 41.
Diploma:
  Admission on, 26.
  Fee, 27.
Direct Current Machinery (Elect. Engineering 2):
  Course offered in, 77.
  Description of Work in, 43.
  Requirement for Graduation, 96.
  Schedule of, 82, 89, 90.
Directions and Suggestions, 30.
Dismissal, Honorable, 32.
Distribution of Electricity (Elect. Engineering 12):
  Course offered in, 77.
  Description of Work in, 43.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Drawing:
  Courses offered in, 71, 73–78.
  Description of Work in, 35, 45.
  Requirement for Admission (Allowed), 17.
  Requirement for Graduation (Courses 4, 5, 6), 95, 96.
  Schedule of (Courses 4, 5, 6), 79, 80, 82, 85–87, 89, 91, 92.
Dynamo Electric Machinery (Elect. Engineering 1):
  Course offered in, 76.
  Description of Work in, 43.
  Requirement for Graduation, 96, 97.
  Schedule of, 81, 83, 84, 86–88, 91–93.
Election of Studies:
  By Literary Students, 21.
  Rules for, 57.
Elective Courses in Department of Literature, Science, and the Arts, 57.
Electric Generation Stations (Elect. Engineering 11):
  Course offered in, 76.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Electric Railways (Elect. Engineering 8):
  Course offered in, 77.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Electrical Engineer, Degree of, 98.
Electrical Engineering:
  Courses offered in, 76, 77.
  Description of Work in, 42, 43.
  Requirement for Graduation ((Courses 1, 2 3, 4, 5, 7, 8, 11, 12, 13, 14), 96, 97.
  Schedule of (Courses 1, 2, 3, 4, 5, 7, 8, 11 12, 13, 14), 81–84, 86–93.

Electrical Engineering Laboratory, 51.
Electrical Measurements (Physics 5, 12):
  Courses offered in, 63, 64.
  Description of Work in, 42.
  Requirements for Graduation, 95, 96, 97.
  Schedule of, 81-84, 86-93.
Electricity (Physics 2)—See Heat, Electricity, and Magnetism, 218.
Employment for Students, 30.
Engineering:
  Civil, 216.
  Mechanical, 219.
  Electrical, 216.
  Chemical, 215.
  Marine, 218.
Engineering Constructions (Civil Engineering 4):
  Course offered in, 74.
  Requirement for Graduation, 96.
  Schedule of, 81, 86, 87.
Engineering Laboratory:
  Mechanical, 49.
  Electrical, 51.
  Chemical, 47.
  Marine, 52.
Engineering Library, 54.
Engineering Shops, 48.
Engineering Society, 54.
English:
  Courses offered in, 60.
  Description of Work in, 32.
  Requirement for Admission, 17.
  Requirement for Graduation (Course 1), 95.
  Schedule of (Course 1), 79.
Examinations:
  Admission, 24.
  Excuse from, 59.
  Given Without Notice, 58.
  Rules relating to, 58.
  Schedule of Admission, 25.
  Schedule of Term, 99.
  Special Fee for, 24.
  Supplementary, 59.
Examining Board, 14.
Expenses:
  Annual, 28.
  See Fees, 27.
Experimental Tank, 52.
Extra Hours, Election of, 58.
Facilities for Instruction, 45.
Faculty, Members of, 5.
Fees:
  Annual, 27.
  Diploma, 27.
  Laboratory, 28.
  Matriculation, 27.
  Refunding of, 27.
  Special Examination, 27.
  Summer Session, 55.
Fellowship in Gas Engineering, 29.
Ferry Athletic Field—See Facilities for Physical Culture, 55, 56.
Field Work in Camp (Surveying 3):
  Course offered in, 73.
  Description of Work in, 37, 38.
  Requirement for Graduation, 95.
  Schedule of, 80, 86.
Forge Shop, 48.
Forging:
  Requirement for Admission (Allowed), 17.
  See Woodwork, Pattern-making, Foundry, Etc., 221.
Foundry:
  See Woodwork, Pattern-making, Foundry, Etc., 221.
  See Pattern-making, Foundry, and Machine Shop, 219.
French:
  Courses offered in, 61.
  Description of Work in, 33.
  Requirement for Admission, 20.
  Requirement for Graduation (Courses 1, 2, 3, 4), 60, 95.
  Schedule of (Courses 1, 2, 3, 4), 79-85, 87, 89, 91, 92.
Gas Analysis, Technical (Chemistry 35):
  Courses offered in, 66, 67.
  Requirement for Graduation, 97.
  Schedule of, 83, 91, 92.
Gas Engineering, Fellowship in, 29.
Gas Engines (Mech. Engineering 11):
  Course offered in, 75.
  Description of Work in, 42.
Gas Fellowship—See Fellowship in Gas Engineering, 29.
General Library, 54.
Geodesy (Surveying 7):
  Course offered in, 73.
  Description of Work in, 39.
Geological Laboratory, 54.
Geology:
  Courses offered in, 70.
  Description of Work in, 42.
  Requirement for Graduation (Course 6), 95.
  Schedule of (Course 6), 80, 86.
Geometry:
  Requirement for Admission, 20.
  See Analytic Geometry, 215.
German:
  Courses offered in, 60.
  Description of Work in, 33.
  Requirement for Admission, 20.
  Requirement for Graduation (Courses 1, 2, 3, 4), 60, 95.
  Schedule of (Courses 1, 2, 3, 4), 79-85, 87, 89, 91, 92.
Golf—See Ann Arbor Golf and Outing Club, 56.
Graduation Requirements for Bachelor of Science Degree in:

  Civil Engineering, 95, 96.
  Mechanical Engineering, 95, 96.
  Electrical Engineering, 95, 96.
  Chemical Engineering, 95, 96, 97.
  Marine Engineering, 95, 97.
Graduate Courses, 97, 98.
Graphics—See Structural Mechanics, 220.
Gymnasium—See Facilities for Physical Culture, 55, 56.
Heat, Electricity, and Magnetism (Physics 2):
  Course offered in, 64.
  Description of Work in, 35.
  Requirement for Graduation, 95.
  Schedule of, 80–85, 87, 89, 91, 92.
Heating and Ventilation (Mech. Engineering 13):
  Course offered in, 75.
  Description of Work in, 42.
Highway Construction, 39.
History:
  Of Department of Engineering, 11.
  Requirement for Admission, 21.
Honorable Dismissal, 32.
Hour of Credit, 56.
Hydraulic Laboratory, 51.
Hydraulics (Civil Engineering 5):
  Courses offered in, 73, 74.
  Description of Work in, 40.
  Requirement for Graduation, 96.
  Schedule of, 80, 82–84, 86–91, 93.
Incomplete, Removal of, 59.
Index of Register of Alumni, 207-214.
Industrial Chemistry, 43.
Information, General, 11.
Inorganic Chemistry (Chemistry 2):
  Course offered in, 65, 66.
  Requirement for Graduation, 95.
  Schedule of, 79.
Inspection, Visits of, 46.
Instruction, Facilities for, 45.
Instrument Shop, 49.
Laboratories:
  Astronomical, 53.
  Chemical, 47.
  Electrical Engineering, 51.
  Geological, 54.
  Hydraulic, 51.
  Marine Engineering, 52.
  Mechanical Engineering, 49.
  Mineralogical, 53.
  Mould Loft, 53.
  Physical, 46.
Laboratory Fees, 28.
Language Courses Required, 60.
Latin, Requirement for Admission, 20.
Lecture Association—See University Organizations, 55.
Libraries, 54.
Light (Physics 1)—See Mechanics, Sound, and Light, 219.
Literary Students, Elections of, In Engineering Department, 57.
Machine Design (Mech. Engineering 4, 6, 8, 10):
  Courses offered in, 75, 76.
  Description of Work in, 41.
  Requirement for Graduation, 96.
  Schedule of, 81–83, 87–90.
Machine Shop (Shop Practice 3):
  Course offered in, 72.
  Description of Work in, 37.
  Requirement for Graduation, 96.
  Schedule of, 81, 87.
Machinery, Prime Movers, and Power Transmission, 41.
Magnetism (Physics 2)—See Heat, Electricity and Magnetism, 218.
Manual Training:
  Description of Work in, 37.
  Shop Work Allowed for Admission, 17.
Marine Boilers (Marine Engineering 8):
  Course offered in, 78.
  Requirement for Graduation, 97.
  Schedule of, 84, 93, 94.
Marine Engine and Boiler Drawing (Mar. Engineering 10, 11):
  Courses offered in, 78.
  Requirement for Graduation, 97.
  Schedule of, 84, 93, 94.
Marine Engineer, Degree of, 98.
Marine Engineering:
  Courses offered in, 78.
  Description of Work in, 45.
  Requirements for Graduation (Courses 8, 9, 10, 11), 95, 96.
  Schedule of (Courses 8, 9, 10, 11), 84, 85, 92–94.
Marine Engineering Laboratory, 52.
Marine Engines (Mar. Engineering 9):
  Course offered in, 78.
  Requirement for Graduation, 97.
  Schedule of, 84, 93, 94.
Master of Science, Degree of, 97.
Mathematics:
  Courses offered in, 62, 63.
  Description of Work in, 34.
  Requirement for Admission, 19.
  Requirement for Graduation (Courses 1, 2, 3, 4, 5, 6), 95, 96, 97.
  Schedule of (Courses 1, 2, 3, 4, 5, 6), 79–93.
Matriculation Fee, 27.
Mechanical and Electrical Measurements (Physics 3c):
  Course offered in, 63, 64.
  Description of Work in, 42.
  Requirement for Graduation, 95, 96, 97.
  Schedule of, 80, 81, 83, 84, 86, 87, 88, 91, 92, 93.
Mechanical Engineering, Degree of, 98.

Mechanical Engineering:
  Courses offered in, 74, 75, 76.
  Description of Work in, 41.
  Requirements for Graduation (Courses 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12), 95, 96.
  Schedule of (Courses 1, 2, 3, 4, 5, 6, 7, 8, 9. 10, 12), 80–94.
Mechanical Engineering Laboratory, 49.
Mechanics (Mathematics 4, 5, 6):
  Courses offered in, 63.
  Description of Work in, 34, 35.
  Requirement for Graduation, 95, 96, 97.
  Schedule of, 80–93.
Mechanics, Sound, and Light (Physics 1):
  Course offered in, 63.
  Description of Work in, 35.
  Requirement for Graduation, 95.
  Schedule of, 80–85, 87, 89, 91, 92.
Mechanism (Mech. Engineering 1):
  Course offered in, 74, 75.
  Requirement for Graduation, 95.
  Schedule of, 80–84, 86–93.
Members of Faculty, 5.
Metallurgy:
  Course offered in, 68.
  Description of Work in, 41.
  Requirement for Graduation, 95.
  Schedule of, 81–84, 86–93.
Mineral Analysis, Courses offered in, 65, 67.
Mineralogical Laboratory, 53.
Mineralogy:
  Courses offered in, 69.
  Description of Work in, 42.
  Requirement for Graduation (Course 1), 95.
  Schedule of (Course 1), 80, 86.
Mould Loft, 53.
Mould Loft Work (Naval Architecture 5):
  Course offered in, 78.
  Description of Work in, 45.
  Requirement for Graduation, 97.
  Schedule of, 84, 93.
Municipal Engineering (Civil Engineering 6):
  Courses offered in, 73.
  Description of Work in, 39.
  Requirement for Graduation, 96.
  Schedule of, 81, 86, 87.
Naval Architect, Degree of, 98.
Naval Architecture:
  Courses offered in, 78.
  Description of Work in, 44, 45.
  Requirement for Graduation (Courses 1, 2, 3, 4, 5, 6, 7), 95, 97.
  Schedule of (Courses 1, 2, 3, 4, 5, 6, 7), 84, 85, 93, 94.
Not Passed, Removal of Record, 58.
Observatory, Astronomical, 53.
Oratorical Associations—See University Organizations, 55.
Order of Studies:
  Deviation from, 13.
  New, 79–85.
  Old, 85–94.
Organic Chemistry (Chemistry 7):
  Course offered in, 65.
  Requirement for Graduation, 97.
  Schedule of, 83, 91, 92.
Organic Technology (Chemistry 38):
  Course offered in, 67.
  Requirement for Graduation, 97.
  Schedule of, 83, 91, 92.
Outside Work Credit for, 57.
Passed, Record of, 58.
Pattern-making and Foundry (Shop Practice 2):
  Course offered in, 72.
  Requirement for Graduation, 96.
  Schedule of, 81, 87.
Pattern-making, Foundry, and Machine Shop (Shop Practice 4):
  Course offered in, 72.
  Requirement for Graduation, 96.
  Schedule of, 82, 89. 90.
Pattern Shop. 48.
Photometry (Elect. Engineering 7):
  Course offered in, 76.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Physical Culture, Facilities for, 55.
Physical Geography, Requirement for Admission, 21.
Physical Laboratory, 46.
Physical Laboratory Work (Physics *3b*):
  Course offered in, 63, 64.
  Requirement for Graduation, 96.
  Schedule of, 82, 89.
Physics:
  Courses offered in, 63, 64.
  Description of Work in, 35.
  Requirement for Admission, 20.
  Requirement for Graduation (Courses 1, 2, *3b*, *3c*, 4, 5, 12), 95, 96, 97.
  Schedule of (Courses 1, 2, *3b*, *3c*, 4, 5, 12), 80–93.
Physiography, Requirement for Admission, 21.
Power Plants. Power Transmission (Mech. Engineering 12):
  Course offered in, 75, 76.
  Description of Work in, 41.
  Requirement for Graduation, 96.
  Schedule of, 81, 82, 86, 88, 89.
Primary and Storage Batteries (Physics 4):
  Course offered in, 64.
  Description of Work in, 42.
  Requirement for Graduation, 96.
  Schedule of, 82, 89.
Qualitative Analysis (Chemistry *3a*, *3b*):

  Courses offered in, 65, 66.
  Requirement for Graduation, 97.
  Schedule of, 80–84, 89–91, 93.
Quantitative Analysis (Chemistry 5, 28):
  Courses offered in, 65, 67.
  Requirement for Graduation, 97.
  Schedule of, 83, 91, 92.
Recommendation for Degrees, 13.
Refrigeration—See Compressed Air and Refrigeration, 216.
Refunding of Fees, 27.
Regents, Board of, 4.
Regents' Certificate, University of the State of New York, 26.
Register of Alumni:
  Classes 1860–1904, 125–205.
  Index of, 207–214.
Register of Students for Year 1904–1905, 101–122.
Relation of Students to Civil Authorities, 31.
Requirements for Admission:
  In force 1905–1906, 13.
  New, effective 1906, 15.
Rhetoric, Requirements for Admission, 18.
Rules:
  Governing Election of Studies, 57.
  Relating to Examinations and Conditions, 58.
Scholarships, 30.
Sequence of Studies, 78.
Shipbuilding, 44.
Ship Calculations (Naval Architecture 2):
  Course offered in, 78.
  Description of Work in, 44.
  Requirement for Graduation, 97.
  Schedule of, 84, 85, 93.
Ship Drawing and Design (Naval Architecture 6, 7):
  Courses offered in, 78.
  Description of Work in, 45.
  Requirement for Graduation, 97.
  Schedule of, 84, 85, 93, 94.
Shops, 48.
Shop Practice:
  Courses offered in, 72.
  Description of Work in, 36, 37.
  Requirement for Graduation (Courses 1, 2, 3, 4), 95, 96.
  Schedule of (Courses 1, 2, 3, 4), 79, 81, 82, 87–90.
Shop Work, Allowed for Admission, 17.
Sound (Physics 1)—See Mechanics, Sound, and Light, 219.
Spanish:
  Courses offered in, 62.
  Description of Work in, 33.
  Requirement for Graduation, 60, 95.
  Schedule of, 79–85, 87, 89, 91, 92.
Special Students, 23.
Stability, Resistance, and Propulsion of Ships (Naval Architecture 4):
  Course offered in, 78.
  Description of Work in, 44.
  Requirement for Graduation, 97.
  Schedule of, 84, 93, 94.
Steam Engineering, 42.
Steam Engines (Mech. Engineering 3):
  Course offered in, 75.
  Requirement for Graduation, 95.
  Schedule of, 81–84, 86, 87, 89–93.
Steam Laboratory (Mech. Engineering 7, 9):
  Courses offered in, 75, 76.
  Requirement for Graduation, 96, 97.
  Schedule of, 81, 82, 84, 85, 87–89, 93, 94.
Steam Turbines:
  Course offered in, 76.
  Description of Work in, 42.
Stereotomy—See Advanced Projections and Stereotomy, 215.
Storage Batteries—See Primary and Storage Batteries, 219.
Strength and Resistance, Elements of (Civil Engineering 11):
  Course offered in, 74.
  Description of Work in, 40.
  Requirement for Graduation, 97.
  Schedule of, 83, 91.
Strength of Ships (Naval Architecture 3):
  Course offered in, 74.
  Description of Work in, 44.
  Requirement for Graduation, 96, 97.
  Schedule of, 82, 84, 88, 93, 94.
Structural Design (Civil Engineering 3):
  Course offered in, 73.
  Requirement for Graduation, 96.
  Schedule of, 81, 86, 87.
Structural Design (Naval Architecture 1):
  Course offered in, 78.
  Requirement for Graduation, 97.
  Schedule of, 84, 93.
Structural Mechanics (Civil Engineering 1):
  Course offered in, 73, 74.
  Requirement for Graduation, 96, 97.
  Schedule of, 80–82, 84–90, 93.
Student Employment, 30.
Students in the Department of Engineering:
  Summary of, 122.
  Register of, for year 1904–1905, 101–122.
Students in the University, Number of, 11.

Students not Candidates for a Degree, Admission of, 23.
Students' Christian Association, 30, 31.
Students' Lecture Association—See University Organizations, 55.
Studies:
  New Order of, 78–84.
  Old Order of, 85–94.
  Sequence of, 78.
Suggestions and Directions, 30.
Summary of Students, 122.
Summer Session:
  Courses offered in, 55.
  Courses required in, 55.
  Date of, for 1905, 54.
  Tuition Fees, 55.
Supplementary Examinations, 59.
Surveying:
  Courses offered in, 72, 73.
  Description of Work in, 37.
  Requirement for Graduation (Courses 1, 2, 3, 4), 95, 96, 97.
  Schedule of (Courses 1, 2, 3, 4), 80, 82, 86, 88–94.
Tank, Experimental, 52.
Telephone, Telegraph, Fire Alarm, Etc. (Elect. Engineering 13, 14):
  Courses offered in, 77.
  Description of Work in, 43.
  Requirement for Graduation, 96.
  Schedule of, 83, 90, 91.
Theory and Analysis of Structures (Civil Engineering 2):
  Course offered in, 73.
  Description of Work in, 40.
  Requirement for Graduation, 96.
  Schedule of, 81, 86, 87.
Theory of Machine Design and Valve Gears (Mech. Engineering 6):
  Course offered in, 75.
  Requirement for Graduation, 96.
  Schedule of, 82, 88, 89.
Thermodynamics (Mech. Engineering 5):
  Course offered in, 75.
  Description of Work in, 42.
  Requirement for Graduation, 96, 97.
  Schedule of, 81, 82, 84, 87, 88, 93, 94.
Thesis, 79, 85, 94.
Topography (Surveying 2):
  Course offered in, 73.
  Description of Work in, 37, 38.
  Requirement for Graduation, 95.
  Schedule of, 80, 86.
Transfer to Another Department, 32.
Trigonometry:
  Course offered in, 63.
  Deficiency in, 63, 80.
  Requirement for Admission, 20.
  Schedule of, 80.
Turbines:
  Course offered in, 76.
  Description of Work in, 42.
Unit, Explanation of, 15.
University Calendar, 13.
University Organizations, 55.
Use of Instruments (Surveying 4):
  Course offered in, 73.
  Requirement for Graduation, 96, 97.
  Schedule of, 82–84, 88, 91–94.
Valve Gears—See Theory of Machine Design and Valve Gears, 221.
Ventilation—See Heating and Ventilation, 218.
Visits of Inspection, 46.
Voluntary Withdrawal, 32.
Waterman Gymnasium—See Facilities for Physical Culture, 55.
Water Supply Engineering (Civil Engineering 7):
  Course offered in, 74.
  Requirement for Graduation, 96.
  Schedule of, 81, 86, 87.
Withdrawal from the Department, 31.
Work done outside the University, Credit for, 57.
Woodwork, Pattern-making, Foundry, and Forging (Shop Practice 1):
  Course offered in, 72.
  Description of Work in, 36, 37.
  Requirement for Graduation, 95.
  Schedule of, 79.
Work of the Department, 32.
Withdrawal, Voluntary, 32.
Young Men's Christian Association, 30, 31.

THE UNIVERSITY BULLETIN IS ISSUED BY THE UNIVERSIT
MICHIGAN AS OFTEN AS EVERY SIX WEEKS DURING THE UNIVE
SITY YEAR.

ENTERED AS SECOND-CLASS MATTER AT THE POSTOFFICE AT AN
ARBOR, MICHIGAN.

THE BULLETIN INCLUDES THE FOLLOWING PUBLICATIONS:—
The Annual Report of the President.
The Calendar of the University.
The Annual Announcements of the Department of Literatu
Science, and the Arts, the Graduate School, the Department
Engineering, of Medicine and Surgery, and of Law, the School
Pharmacy, the Homœopathic Medical College, the College
Dental Surgery, and the Summer Session.
Other Announcements of the several departments of instruction, R
ports of University officers, etc.

Ann Arbor Press
The Richmond & Backus Co.
Printers

1905/06

UNIVERSITY OF MICHIGAN

DEPARTMENT OF ENGINEERING

FIRST SEMESTER—1905-6

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students entering the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission to the department. After having been admitted and having paid their fees, they should report for assignment to classes in Room 409 on the top floor of the *new* Engineering building at the following times, *according to the numbers on their admission certificates.* Treasurer's receipt must be presented at this time. Students who desire advanced credit should bring with them at that time their credentials and all drawings made by them if they desire credit in that subject:

Nos. 2124 to 2160, Saturday, Sept. 23 at 8 A. M.
Nos. 2161 to 2195, Saturday, Sept. 23 at 10 A. M.
Nos. 2196 to 2230, Saturday, Sept. 23 at 2 P. M.
Nos. 2231 to 2265, Saturday, Sept. 23 at 4 P. M.
Nos. 2266 to 2300, Monday, Sept. 25 at 8 A. M.
Nos. 2301 to 2335, Monday, Sept. 25 at 10 A. M.
Nos. 2336 to 2370, Monday, Sept. 25 at 2 P. M.
Nos. 2371 to 2405, Monday, Sept. 25 at 4 P. M.
Nos. 2406 to 2440, Tuesday, Sept. 26 at 8 A. M.

Nos. 2441 to 2475, Tuesday, Sept. 26 at 10 A. M
Nos. 2476 to 2510, Tuesday, Sept. 26 at 2 P. M
Nos. 2511 to 2545, Tuesday, Sept. 26 at 4 P. M

Students *re-entering* the department after havin withdrawn should present themselves to the Secretar for re-enrollment.

Tardy Registration. Students who have not pr sented themselves for classification by Wednesday, Sep 27 must present an excuse from the Associate Dean b fore being classified. Notice of hours and places o classification may be found on the bulletin board.

Removal of Conditions. Examinations for remov of conditions will be held Friday and Saturday, Sept. 2 and 23. Previous application must be made to the in structor and a blank obtained at the Secretary's offic The results of the examinations will, so far as possibl be in the hands of the classifiers on Monday morning.

Advanced Credits. Students desiring advance credits beyond the eight hours which may be given b the Associate Dean for modern language work, shoul apply to the Associate Dean at the time of admissio for a blank upon which the subjects in which credit desired will be checked. This blank should then b taken to the proper teachers, at the times and place indicated below.

Classification. *Treasurer's receipt must be presente at time of classification.*

All students entering upon their *second year's wor* whether candidates for a degree or special student should report on Saturday, Monday or Tuesday i Room 300, new Engineering building, for classificatio On Wednesday and the remainder of the week in Roo I.

Students commencing their *third* or *fourth year work* should report for classification as follows:

Civil Engineers, Professor Williams and Assista Professor Greene, Room 205.

Mechanical Engineers, Professor Allen, Room 217.
Electrical Engineers, Professor Patterson, Room 201.
Chemical Engineers, Professor Campbell, Chemical Laboratory.
Marine Engineers, Professor Sadler, Room 327.

Special Students in their third or fourth years of residence should report with the regular students of the most closely allied course.

Enrollment in Classes. After receiving his election blank, the student must at once register in each class to which he has been assigned. The class lists will be in Room 315 on Saturday, Monday and Tuesday; after that date in the Secretary's office. Students who are classified after Tuesday must, in addition, present their classification cards to the instructor of each class in which they are to register.

OFFICES AND OFFICE HOURS.

For the week commencing Saturday, Sept. 23.

Dean—Professor Cooley. Office hours for students, 11-12. Room 213.

Associate Dean—Professor Davis. 9-12 and 2-5, beginning Sept. 20. Room 6.

Secretary—Assistant Professor Goulding. Office hours same as Classification Committee. The Secretary's office will be open daily from 8-12 and 1:30-5.

Classification Committee—The offices are given in paragraph headed *Classification.*

1st and 2nd year students:
Saturday, Monday and Tuesday, 8-12 and 2-5.

3rd and 4th year students:
Monday, 9-12 and 2-5.
Tuesday, 9-12 and 2-5.

On Tuesday evening classification will be continued at half-past seven, until all students who received numbers before five o'clock have had an opportunity to be classified.

Wednesday }
Thursday } 4-5 P. M.
Friday }
Saturday, 9-10 A. M.

Advanced Credits. Except when otherwise stat the consultation hours of the instructors in charge v be as follows:

Saturday, Monday and Tuesday, 9-10 and 2-3.
Wednesday, Thursday and Friday, 4-5.
Saturday, 9-10.

English	Mr. Bohn, Room 317.
French, German, and Spanish. 3, Old Engineering Bldg.	Assistant Professor Wait. Ro
Mathematics	Professor Ziwet. Room 312.
Physics	Professor Reed, Physical L oratory.
Chemistry 2	Mr. Smeaton. Room 317.
Chemistry, advanced. Metallurgy	Professor Campbell. Chemi Laboratory.
Mineralogy	Assistant Professor Kraus. T pan Hall.
Geology	Professor Russell. Room 6, floor, Museum.
Drawing	Professor Denison. Room 41
Shop Practice	Superintendent Miggett. En neering Shops.
Surveying	Professor Davis. Room 301 3 P. M. after Oct. 1 only)
Civil Engineering	Professor Williams. Room 2
Mechanical Engineering	Professor Allen. Room 217.
Electrical Engineering	Professor Patterson. Room 2
Naval Architecture and Marine Engineering	Professor Sadler. Room 327

Commencement of Work. The work of the clas in the Engineering Department will begin on Wedne day, Sept. 27, and on and after that date all classes w meet at their regular hours.

SCHEDULE.

ABBREVIATIONS: U.- University Hall. T.—Tappan H Phys. Physics Laboratory. Chem.- Chemical Laboratory.

Numbers below 100 not followed by letters indicate the old ngineering building.

Numbers above 100 indicate the new Engineering building.

NGLISH

1. Paragraphing and Theme Writing. ***Four hours.***

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 8	21	Mr. Bohn.
II.	M T W Th at 8	22	Mr. Tarbox.
III.	T W Th F at 10	21	Mr. Bohn.
IV.	T W Th F at 10	22	Mr. Tarbox.
V.	M T W Th at 2	21	Mr. Breitenbach.
VI.	M T W Th at 2	22	Mr. Tarbox.
VII.	T W Th F at 3	21	Mr. Bohn.
VIII.	T W Th F at 3	22	Mr. Breitenbach.

1a. Theme Writing. ***Two hours.***

This course is for students who have completed the old course 1 (two hours). It will not be offered after this semester.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 9	1	Mr. Breitenbach.
II.	T Th at 11	22	Mr. Breitenbach.

ERMAN

1. Elementary Course. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	32	Mr. Dubee.
II.	M T Th F at 11	1	Mr. Menger.
III.	M T Th F at 2	1	Asst. Prof. Wait.

2. Elementary Course continued. *Four hours.*

I.	M T Th F at 1	6	Mr. Menger.

3. German Scientific Literature. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	21	Mr. Menger.
II.	M T Th F at 9	22	Mr. Scholl.
III.	M T Th F at 10	1	Asst. Prof. Wait.
IV.	M T Th F at 10	32	Mr. Dubee.
V.	M T Th F at 11	10	Mr. Scholl.
VI.	M T Th F at 2	24	Mr. Menger.
VII.	M T Th F at 2	6	Mr. Dubee.
VIII.	M T Th F at 3	1	Mr. Dubee.

4. German Scientific Literature continued. *Four hours.*

I.	M T Th F at 1	1	Asst. Prof. Wait.

2. Principles of Inorganic Chemistry. *Four hours.* course is for students who have had the high chemistry required for entrance.

Lectures W at 11 and S. at 9, Lower Lecture Room Medical Building. Mr. Smeaton and Mr. ——

Quizzes.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M Th at 8	B, Chem.	
II.	T F at 8	B, Chem.	
IV.	T F at 9	C, Chem.	
V.	M Th at 10	A, Chem.	
VI.	M Th at 10	201.	
VII.	T F at 10	A, Chem.	
VIII.	T F at 10	201.	

3 Qualitative Analysis. *Seven hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	A, Chem.	Prof. Jo
II.	M W F at 9	B, Chem.	Mr. Wi

In addition four laboratory periods at hours to be arr

Open to those who have completed Course 2.

3*a*. Qualitative Analysis. *Four hours.*

Sec. I. T, Th, at ,8 Room A, Chem. Prof. Johnso

In addition two laboratory periods at hours to be arr

Open to those who have completed Course 2.

3*b*. Qualitative Analysis, continued. *Four hours.*

Sec. I. T, Th, at 9, Room B, Chem. Prof. Johnson

In addition two laboratory periods at hours to be arr

This is a continuation of Course 3*a*. Courses 3*a* are together equivalent to Course 3.

5. Quantitative Analysis. *Five hours.*

Sec. I, T, Th. at 10, Room B, Chem. Prof. Campb

In addition three laboratory periods at hours to ranged. Open to those who have completed Co It may also be taken at the same time as 3*b*.

7. Organic Chemistry. *Five hours.*

Sec. I, M, T, W, Th, F at 9, Room A, Chem. Go

Open to those who have completed Course 3.

28. Advanced Quantitative Analysis. Laboratory *Five hours.* Professor Campbell.

Hours to be arranged. Open to those who have con Course 5.

29. Iron and Steel Analysis. Laboratory Work. *Five* Professor Campbell.

Open to those who have completed Course 28 and special permission.

31. Independent Work in Mineral Analysis. Laboratory Work. *Five hours.* Professor Campbell.
Open to those who have completed Course 28.

32. Assaying of Gold and Silver Ores. Laboratory Work. *Two hours.* Assistant Professor White.
Sec. I M W 1-4.
Sec. II. T Th 1-4.
Open to those who have completed Course 28. A course in Mineralogy is recommended.

33. Chemical Technology. Class Work. *Five hours.* Assistant Professor White.
Sec. I. M T W Th F at 11, Room B, Chem.
Asst. Prof. White
Open to those who have completed Course .3

35. Gas Analysis. Laboratory work. *Two hours.* Assistant Professor White.
Sec. I. M W 1-4
II. T Th 1-4
Open to those who have completed Course 5

39. Chemical Technology. Laboratory Work. *Five hours.* Professor Campbell and others of the laboratory staff.
Open to those who have completed Courses 28 and 33.

METALLURGY

1. Fuel, Refractory Material, Iron and Steel. *Two hours*
Sec. I. M W F at 9, Room 309.
Prof. Campbell and Mr. Zimmerschied

2. Descriptive study of influence of heat and mechanical treatment upon metals and alloys. *One hour.*
One lecture a week at hour to be arranged.
Open to those who have completed Course 1.

3. Micrometallography. Laboratory Work. *One hour.*
Laboratory period to be arranged.
Must be preceded or accompanied by Course 2

ASTRONOMY

1. General Astronomy. The Solar System. *Two hours.*
T Th at 10, Room 22, U. Prof. Hussey.

3. Spherical and Practical Astronomy Use of Sextant and Transit *Two hours.*
M W at 10, Room 22, U. Prof. Hussey.

MINERALOGY

1. Elements of Mineralogy. *Two hours.*
Lectures T Th at 9, Mineral. Lect. Rm.. T. H.
Asst. Prof. Kra
In addition two hours laboratory work a week. to be a ranged.
A knowledge of elementary inorganic chemistry is nece sary.

3. Crystal Measurements. *Three hours.* Asst. Prof. Krai
Lectures and laboratory work, to be arranged.
Open to those who have completed Course 2.

4. Determinative Mineralogy. *Two hours.* Asst. Prof. Krai
Laboratory work, to be arranged.
Open to those who have completed Course 1.

5. Blowpipe Methods. *Two hours.*
Lectures M W at 8, Min. Lect. Rm. Asst. Prof. Krai
In addition two hours laboratory work, to be arranged.

GEOLOGY

1. Elements of Geology. Dynamic and Structural Geolo
M W F at 11, Museum Lecture Room. Prof. Russe

DRAWING

1. Geometrical Drawing. (Elective.) *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F from 2-4	415	Mr. Murphey.

2. Free-Hand Drawing. (Elective.) *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F from 8-10	35	Miss Hunt.
II.	M W F from 1- 3	35	Miss Hunt.

4. Descriptive Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	Recitation M W F at 8,	427	Mr. Wils
	Drawing S from 9-11.	415	Mr. ——
II.	Recitation M W F at 9,	427	Mr. Wils
	Drawing S from 9-11,	415	Mr. ——
III.	Recitation M W F at 10,	427	Mr. ——
	Drawing W from 2-4,	415	Mr. ——
IV.	Recitation M W F at 11,	427	Mr. Wils
	Drawing W from 2-4,	415	Mr. Wils
V.	Recitation T Th F at 8,	402	Mr. Bartl
	Drawing W from 2-4,	418	Mr. Bartl

VI.	Recitation	M W F	at 9,	402	Mr. Bartlett.
	Drawing	Th	from 2-4,	418	Mr. Bartlett.
VII.	Recitation	M W F	at 10,	402	Mr. Bartlett.
	Drawing	S	from 8-10,	418	Mr. Bartlett.
VIII.	Recitation	T Th S	at 11,	402	Mr. Bartlett.
	Drawing	W	from 2-4,	418	Mr. Bartlett.
IX.	Recitation	T Th F	at 8,	401	Mr. Murphey.
	Drawing	W	from 2-4,	403	Mr. Murphey.
X.	Recitation	T Th S	at 11,	401	Mr. Murphey.
	Drawing	S	from 8-10,	403	Mr. Murphey.
XI.	Recitation	M W F	at 10,	401	Mr. Murphey.
	Drawing	S	from 8-10,	403	Mr. Murphey.
XII.	Recitation	T Th S	at 11,	427	Mr. ———
	Drawing	W	from 2-4,	403	Mr. Murphey
XIII.	Recitation	M W F	at 8,	409	Mr. ———
	Drawing	W	from 2-4,	415	Mr. ———
XIV.	Recitation	T Th S	at 8,	409	Mr. ———
	Drawing	Th	from 2-4,	418	Mr. ———
XV.	Recitation	M W F	at 9,	401	Mr. ———
	Drawing	S	from 10-12,	415	Mr. Wilson.
XVI.	Recitation	M W F	at 9,	428	Asst. Prof. Goulding.
	Drawing	W	from 2-4,	415	Mr. ———
XVII.	Recitation	M W F	at 11,	409	Prof. Denison.
	Drawing	S	from 8-10,	418	Mr. Bartlett.

5*a*. Advanced Projections. *Two hours.*

SECTIONS		TIME		ROOM	INSTRUCTOR
I.	Recitation	T Th	at 9,	409	Prof. Denison.
	Drawing	S	from 8-10.	415	Asst. Prof. Goulding.
II.	Recitation	T Th	at 10,	409	Prof. Denison.
	Drawing	S	from 8-10.	415	Asst. Prof. Goulding.
III.	Recitation	T Th	at 11,	428	Asst. Prof. Goulding.
	Drawing	S	from 8-10,	415	Mr. Wilson.

10. Free-Hand Lettering. (Elective.) *Two hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	T Th	from 8-10,	415	Asst. Prof. Goulding.

SHOP PRACTICE

1. Woodwork, Pattern-Making. Foundry, Forging and Metal Forming and Cutting Operations. *Four hours.* Fee $10.00. Mr. Purfield and Mr. McDonald.

SECTION								
I.	M				F		7:30-12.	Quiz W at 11.
II.			W			S	7:30-12.	Quiz W at 1.
III.	M			Th			1:00- 5:30.	Quiz W at 10.
IV.		T			F		1:00- 5:30.	Quiz Th at 2.

2. Pattern-Making and Foundry. (Advanced.) *Four hours.* Fee $10.00. Mr. Purfield and Mr. Bull.

SECTION						
I.		T	Th		7:30-12.	Quiz W at 9.
II.	M			F	1-5:30.	Quiz W at 2.

3. Machine Shop. *Four hours.* Fee $10.00. Mr. Cobb.

I.		T		Th		7:30-12.	Quiz W at 9.
II.	M				F	1-5:30.	Quiz W at 2.
III.		T		Th		1-5:30.	Quiz W at 3.
IV.			W(1-5:30)			S (7:30-12).	Quiz W at 10.

3*a*. Foundry. *Two hours.* Mr. Bull.

This course is for the students who have had pattern making as a separate course and who require a two hour course in foundry work to complete their shop requirements. It will not be offered after this semester.

Sec. I.	W			1-5:30.
Sec. II.		Th		1-5:30.
Sec. III.			S	7:30-12.

SURVEYING

1. Lectures. Text-book and Field Practice. ***Five hours.*** M T W Th F from 1-5. Prof. Davis and Mr. Merrick.

Owing to the large number of students to take this course during this semester, it may be taken only by those for whom it comes in regular course.

4. Use of Instruments. *One hour.* Professor Davis and Mr. Merrick.

Lectures	Sec. I.	Th		at 8, Room 301.
	Sec. II.	Th		at 9, Room 301.
	Sec. III.		S	at 8, Room 301.

Field work.

Sec. I.	M					9-12.
Sec. II.		T				9-12.
Sec. III.			Th			8-11.
Sec. IV.				F		9-12.
Sec. V.					S	8-12.

CIVIL ENGINEERING

1. Structural Mechanics. *Five hours.* Must be preceded or accompanied by Course 5 in Mathematics.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th F at 8,	203.	Mr. ———
II.	M T W Th F at 9,	205.	Asst. Prof. Wrentmore.
III.	M T W Th F at 9,	203.	Asst. Prof. Greene.
IV.	M T W Th F at 10,	203.	Mr. Tilden.
V.	M T W Th F at 11,	203.	Mr. Tilden.
VI.	M T W Th F at 11,	301.	Mr. ———

2. Theory and Analysis of Structures. *Four hours.* Must be preceded by Course 1.

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 1,	205.	Asst. Prof. Wrentmore.
II.	M T W Th at 1,	203.	Asst. Prof. Greene.

3. Structural Design. *Four hours.* Must be preceded or accompanied by Course 2.

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T W Th F 2-5,	302.	Asst. Prof. Wrentmore.
II.	M T W Th F 2-5,	307.	Asst. Prof. Greene.
III.	M T W Th F 2-5,	302.	Mr. ———

5. Hydraulics. *Four hours.* Must be preceded or accompanied by Course 6 in Mathematics.

Lecture for all sections F at 11, Room 309. Prof. Williams.

Recitations.

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 8,	205.	Prof. Williams.
II.	M T W Th at 11,	205.	Prof. Williams.
III.	M T W Th at 11,	318.	Mr. Bragg.
IV.	M T W Th at 11,	309.	Mr. Loomis.

6. Municipal Engineering. *Two hours.* Must be preceded by Course 1 and preceded or accompanied by Course 5.

Sec. I. M W F at 10, Room 205. Prof. Williams.

8. Experimental Hydraulics. *Three hours.* Must be preceded by Course 5.

Hours to be arranged. Prof. Williams.

10. Testing Materials. *Two hours.* Must be preceded by Course 1.

Sec. I. F 1:30 to 5:30. Room 122. Mr. Tilden.
Sec. II. S 8 to 12. Room 122. Mr. Tilden.

MECHANICAL ENGINEERING

1. Principles of Mechanism. *Four hours.*

Lecture for all sections W at 10, Room 309. Prof. Denison.

Recitations—

SECTION	TIME	ROOM	INSTRUCTOR
I.	M W F at 8,	428.	Asst. Prof. Goulding.
II.	M W F at 8,	219.	Mr. Loomis.

III. M W F at 9, 409. Prof. Denison.
IV. T Th F at 10, 428. Mr. Loomis.
V. T Th F at 11, 327. Mr. Bursley.
VI. M W F at 1, 427. Mr. Wilson.

Drawing—
I. M from 10-12, 415. Mr. Higbie.
II. M from 1-4, 418. Mr. Bursley.
III. T from 1-3, 418. Mr. Bartlett.
IV. F from 1-3, 418. Mr. Higbie.
V. F from 2-4, 418. Mr. Loomis.
VI. S from 8-10, 315. Mr. Bursley.

2. Sketching of Machine Details. *Three hours.*
Sec. I. M W F from 1-4, Room 403. Asst. Prof. Hazelton and Mr. Bursley.

3. Steam Engines and Other Heat Engines. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9,	219.	Mr. Bursley.
II.	M T Th F at 10,	219.	Prof. Allen.
III.	M T Th F at 11,	219.	Asst. Prof. Anderson.

4. Machine Design. Machine Tools. *Two hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	T Th 1-4,	Shops.	Supt. Miggett.
II.	W (1-4) S (9-12)	Shops.	Supt. Miggett.

5. Thermo-dynamics. *Three hours.*
Sec. I. M W F at 9, Room 217. Prof. Allen.

6. Theory Machine Design. *Three hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M W F at 9,	318.	Asst. Prof. Hazelton.
II.	M W F at 10,	318.	Asst. Prof. Hazelton.

7. Steam Laboratory. Calibration of Instruments. *Two hours.*
I. T 1-5:30. Mr. Higbie.
II. Th 1-5:30. Mr. Higbie.

8. Machine Design. Hoisting Machinery. *Three hours.*
Sec. I. M W F 1-4, Room 317. Asst. Prof. Hazelton.

9. Steam Laboratory. Testing of Engines and Boiler. *Three hours.*
Sec. I. M F from 1-5:30. Asst. Prof. Anderson.
Sec. II W (1-5:30) S (8-12). Mr. Higbie.

10 Machine Design Engines and Boilers. *Two hours.*
Sec I T Th from 1-4, Room 315. Mr. Loomis.

11 Gas Engine. *Two hours.*
Sec I. T Th at 8, Room 217. Prof. Allen.

13 Heating and Ventilation. *Two hours.*
Sec I T Th at 11, Room 217. Prof. Allen.

15. Hydraulic Machinery. (Advanced.) ***Two hours.***
Sec. I. T Th at 9, Room 217. Prof. Cooley.

16. Laboratory Work. (Advanced.) ***Two hours.***
Sec. I. T Th from 1-4. Asst. Prof. Anderson

ELECTRICAL ENGINEERING

1. Dynamo-Electric Machinery. ***Three hours.***
Lectures. Prof. Patterson.

SECTIONS	TIME	ROOM
I.	T Th at 10.	309.
II.	T Th at 10.	309.

Recitations. Prof. Patterson.

SECTIONS	TIME	ROOM
I.	W at 8.	309.
II.	F at 8.	309.

Laboratory Work.

SECTION	TIME	ROOM	INSTRUCTOR
I.	T 8-10.	101.	Mr. Bailey.
II.	Th 8-10.	101.	Mr. ———
III.	S 8-10.	101.	Mr. ———
IV.	S 10-12.	101.	Mr. ———

Course 1 must be preceded by Courses 1, 2, 3 and 4 (or 3*c*) in Physics.

3. Alternating Current Generators and Transformers. ***Four hours.***
Lectures and Recitations. Prof. Patterson.
Sec. I. M W F at 9. Room 201.
Laboratory Work. Mr. Bailey.

SECTIONS	TIME	ROOM
I.	M 2-4.	102.
II.	W 2-4.	102.
III.	F 2-4.	102.
IV.	S 10-12.	102.

Course 3 must be preceded by Course 2.

5. Design of Electrical Machinery and Appliances. ***Four hours.***
Lectures and recitations. Prof. Patterson.
Sec. I. T Th at 8. Room 201.
Drawing. Mr. Bailey.
Sec. I. T Th 1-5. Room 202.
Course 5 must be preceded by Course 1 or 2.

7. Photometry of Electric Lamps. ***One hour.***
Lectures and recitations. Prof. Patterson.
Sec. I. M at 8. Room 201.
Laboratory Work.

Hours to be arranged.
Course 7 must be preceded by Course 1 or 2.

9. Storage Battery Installations. *Two hours.*
Lectures and laboratory work. Mr. Bailey.
Hours to be arranged.

11. Electric Generating Stations and Sub-stations. *One hour.*
Lectures. Prof. Patterson.
Hours to be arranged. Room 201

13. Telephone, Telegraph and Related Apparatus. *Two hours.*
Lectures and recitations. Mr. Morehouse.
Sec. I. W F at 8, Room 201.
Course 13 must be preceded or accompanied by Course 1 or 2.

15. Telephone, Telegraph and Related Apparatus. *Two hours.*
Laboratory work. Mr. Morehouse.
Hours to be arranged. Room 111.
Course 15 must be preceded or accompanied by Course 13.

NAVAL ARCHITECTURE AND MARINE ENGINEERING

1. Naval Architecture. Structural Design. *One hour.*
Th. at 10. Room 327. Prof. Sadler.

2. Naval Architecture. Ship Calculations. *Two hours.*
T, Th, at 9. Room 327. Prof. Sadler.

3. Naval Architecture. Strength of Ships. *Two hours.*
M, W. at 9. Room 327. Prof. Sadler.

5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
Hours to be arranged. Prof. Sadler.

6. Naval Architecture. Ship drawing and design. *Three hours.*
Hours to be arranged. Prof. Sadler.

8. Marine Boilers. *Two hours.*
M, W, at 10. Room 327. Prof. Sadler.

10. Marine Engine and Boiler Drawing and Design. *One hour.*
Hours to be arranged. Prof. Sadler.

GYMNASIUM WORK

Class work in the gymnasium begins the first Monday in November. Physical examinations must be arranged before that date Prof Fitzpatrick.

SECTION					
I.	M		Th		11:15-12:00.
II.	M		Th		4:15- 5:15.
III		T		F	4:15 5:15.
IV	M		Th		8:00- 9:00.

5/06

[February, 1906.

UNIVERSITY OF MICHIGAN

SPECIAL ANNOUNCEMENT

OF THE

DEPARTMENT OF ENGINEERING

Second Semester—1905-6

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students desiring to enter the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission to the department. After having been admitted and having paid their fees, they should report for assignment to classes in Room 409 on the top floor of the *new* Engineering building.

Students *re-entering* the department after voluntary withdrawal should present themselves to the Secretary for re-enrollment.

Advanced Credits. Students desiring advanced credits beyond the eight hours which may be given by the Associate Dean for modern language work, should apply to the Associate Dean at the time of admission for a blank upon which the subjects in which credit is desired will be checked. This blank should then be taken to the proper teachers, as indicated below. Their office hours for Monday and Tuesday, February 12 and 13, will be from 11 to 12.

English	Mr. Bohn, Room 317.
French, German, and **Spanish**	Assistant Professor Wait. Room 3, Old Engineering Building.
Mathematics	Professor Ziwet. Room 312.
Physics	Professor Carhart. Physical Laboratory.
Chemistry Metallurgy	Professor Campbell. Room 101, Chemical Laboratory.
Astronomy	Professor Hussey, Observatory.
Mineralogy	Assistant Professor Kraus. Tappan Hall.
Geology	Professor Russell. Room 6, top floor, Museum.
Drawing	Professor Denison. Room 414.
Shop Practice	Superintendent Miggett. Engineering Shops.
Surveying	Professor Davis. Room 6.
Civil Engineering	Professor Williams. Room 205.
Mechanical Engineering	Professor Allen. **Room 217.**
Electrical Engineering	Professor Patterson. Room 201.
Naval Architecture and Marine Engineering	Professor Sadler. Room 327.

Tardy Registration. Students who have not presented themselves for classification by Tuesday, Feb. 13, must present an excuse from the Associate Dean before being classified. This excuse should be obtained in advance of a contemplated absence. Students thus registering late will be classified by their regular classifier at such hours as he may set aside for that purpose.

CLASSIFICATION OF FIRST YEAR STUDENTS

Hours, Monday and Tuesday, Feb. 12 and 13, 8-12 and 2-5.

First year students will be classified by **Assistant Professor** Wrentmore and Mr. Tarbox, in Room 409, **in the order of their** admission numbers, as follows:

Nos. 2124 to 2184.	Monday.	Feb. 12 at 8 A. M.
Nos. 2185 to 2245.	Monday.	Feb. 12 at 10 A. M.
Nos. 2246 to 2306.	Monday.	Feb. 12 at 2 P. M.
Nos. 2307 to 2367.	Monday.	Feb. 12 at 4 P. M.
Nos. 2368 to 2428.	Tuesday.	Feb. 13 at 8 A. M.
Nos. 2429 to 2489.	Tuesday.	Feb. 13 at 10 A. M.
Nos. 2489 to 2549.	Tuesday.	Feb. 13 at 2 P. M.
Nos. 2550 to -- —	Tuesday.	Feb. 13 at 4 P. M.

CLASSIFICATION OF SECOND YEAR STUDENTS

Hours, Monday and Tuesday, Feb. 12 and 13, 8-12 and 2-5.

Civil Engineers	Mr. Tilden. Room 301.
Mechanical Engineers	Mr. Bursley. Room 318.
Electrical Engineers	Mr. Bailey. Room 309.
Chemical Engineers	Assistant Professor White. Room 313.
Marine Engineers	Professor Sadler. Room 327.
Special Students	Assistant Professor White. Room 313.

CLASSIFICATION OF THIRD YEAR STUDENTS

Hours, Monday and Tuesday, Feb. 12 and 13, 8-12 and 2-5.

Civil Engineers	Assistant Professor Greene. Room 203.
Mechanical Engineers	Assistant Professor Anderson. Room 219.
Electrical Engineers	Mr. Morehouse. Room 201.
Chemical Engineers	Professor Campbell. Room 101, Ch.
Marine Engineers	Professor Sadler. Room 327.

CLASSIFICATION OF FOURTH YEAR STUDENTS

Hours, Monday and Tuesday, Feb. 12 and 13, 8-12 and 2-5.

Civil Engineers	Professor Williams. Room 205.
Mechanical Engineers	Professor Allen. Room 217.
Electrical Engineers	Professor Patterson. Room 201.
Chemical Engineers	Professor Campbell. Room 101, Ch.
Marine Engineers	Professor Sadler. Room 327.

Enrollment in Classes. After receiving his election blank, the student must at once register in each class to which he has been assigned. The class lists will be in Room 315 on Monday and Tuesday; after that date in the Secretary's office. Students who are classified after Tuesday must, in addition, present their classification cards to the instructor of each class in which they are to register.

Change of Classification. During the first week of the semester any classifier may at his discretion change a classification previously approved by him. After the close of the first week, a student desiring to change his elections, or to drop work, must file his request and reasons with the Secretary of the Department and continue in his regularly assigned classes until he has received permission to make a change.

Commencement of Work. Classes in the Engineering Department will begin on Wednesday, Feb. 14, and on and after that date all classes will meet at their regular hours.

SCHEDULE OF COURSES.

ABBREVIATIONS: U.—University Hall. T.—Tappan Hall. Phys.—Physics Laboratory. Ch.—Chemical Laboratory.

ENGLISH

1. Paragraphing and Theme Writing. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 8	21	Mr. Breitenbach.
II.	M T W Th at 8	22	Mr. Tarbox.
III.	T W Th F at 10	21	Mr. Bohn.
IV.	T W Th F at 10	22	Mr. Tarbox.
V.	M T Th F at 2	21	Mr. Bohn.
VI.	M T Th F at 2	22	Mr. Tarbox.
VII.	T W Th F at 3	21	Mr. Bohn.
VIII.	T W Th F at 3	22	Mr. Breitenbach.

2. Technical Journalism. *Two hours.*
Hours to be arranged. Mr. Breitenbach.
Open to those who receive special permission.

3. Scientific Literature. *Two hours.*
Hours to be arranged. Mr. Tarbox.
Open to those who receive special permission.

GERMAN

1. Elementary Course. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 1	10	Mr. Menger.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	10	Mr. Dubee.
II.	M T Th F at 10	1	Asst. Prof. Wait.
III.	M T Th F at 2	10	Mr. Menger.

3. German Scientific Literature. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	31	Mr. Dubee.
II.	M T Th F at 2	1	Asst. Prof. Wait.

4. German Scientific Literature continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	31	Mr. Dubee.
II.	M T Th F at 9	22	Mr. Menger.
III.	M T Th F at 9	1	Asst. Prof. Wait.
IV.	M T Th F at 10	10	Mr. Menger.
V.	M T Th F at 2	31	Mr. Dubee.
VI.	M T Th F at 3	10	Mr. Menger.

5. Advanced Course in German Scientific Literature. *Three hours.*

Hours to be arranged. Asst. Prof. Wait.

FRENCH

1. Elementary Course. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	32	Mr. Kenyon.
II.	M T Th F at 2	28	Mr. Adams.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	10	Mr. Adams.
II.	M T Th F at 9	32	Mr. Kenyon.
III.	M T Th F at 2	26	Mr. Bird.
IV.	M T Th F at 3	28	Mr. Adams.

3. French Scientific Literature. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 1	28	Mr. Adams.

4. French Scientific Literature continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	26	Mr. Bird.
II.	M T Th F at 2	24	Mr. Kenyon.

5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.)

Hours to be arranged Mr. Bird.

SPANISH

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	26	Mr. Bird.
II.	M T Th F at 1	24	Mr. Kenyon.

MATHEMATICS

1. Algebra and Analytic Geometry. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 1	31	Mr. Love.

1*a*. Plane Trigonometry. *Two hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	T Th at 11	24	Dr. Bradshaw

2. Analytic Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T W Th F at 9	24	Mr. Escott.
II.	T W Th F at 9	313	Dr. Pierce.
III.	T W Th F at 9	31	Mr. Love.
IV.	T W Th F at 9	27, U	Mr. Garretson.
V.	M T Th F at 10	24	Dr. Bradshaw.
VI.	M W F S at 9	21	Dr. Karpinski.
VII.	M T Th F at 8	28	Mr. Love.
VIII.	M T Th F at 11	28	Dr. Karpinski.
IX.	T W Th S at 10	28	Dr. Karpinski.
X.	M T Th F at 11	31	Dr. Running.
XI.	M T Th F at 11	313	Mr. Love.
XII.	M T Th F at 11	27, U	Mr. Garretson.
XIII.	M T Th F at 11	6	Dr. Field.
XIV.	M T Th F at 11	21	Dr. Ford.
XV.	T W Th S at 8	26	Mr. Garretson.
XVI.	M T Th F at 10	27, U	Mr. Garretson.

2*a*. Spherical Trigonometry. *Two hours.* (Elective.)

SECTION	TIME	ROOM	INSTRUCTOR
I.	T Th at 10	22, U	Mr. Escott.

3. Calculus. *Five hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T W Th F at 1	H, U	Dr. Bradshaw.

4. Calculus and Mechanics I. *Five hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th F at 8	313	Prof. Ziwet.
II.	M T W Th F at 8	H, U	Prof. Markley.
III.	M T W Th F at 8	19, U	Asst. Prof. Glover.
IV.	M T W Th F at 8	318	Dr. Running.
V.	M T W Th F at 8	24	Mr. Escott.
VI.	M T W Th F at 8	309	Dr. Karpinski.
VII.	M T W Th F at 9	6	Dr. Field.
VIII.	M T W Th F at 9	1, T	Mr. Marshall.
IX.	M T W Th F at 9	28	Dr. Ford.
X.	M T W Th F at 10	313	Dr. Pierce.
XI.	M T W Th F at 10	6	Dr. Field.
XII.	M T W Th F at 2	318	Dr. Pierce.

6. Calculus and Mechanics III. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	301	Dr. Field.
II.	T Th at 8	203	Dr. Ford.
III.	T Th at 9	427	Dr. Running.
IV.	T Th at 10	427	Prof. Ziwet.
V.	T Th at 10	318	Asst. Prof. Glover.
VI.	T Th at 10	402	Mr. Marshall.
VII.	T Th at 11	402	Mr. Marshall.
VIII.	T Th at 2	313	Mr. Marshall.

16. Advanced Mechanics. *Three hours.* (Elective.)
Hours to be arranged Prof. Ziwet.

30. Harmonic Analysis II. *Two hours.* (Elective.)
Hours to be arranged. Prof. Ziwet.

PHYSICS

2. Heat, Electricity and Magnetism. *Five hours.*
Lectures M, W, F, at 11. Lecture Room B, Physics Building. Prof. Carhart.
Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	20, Phys.	
II.	T Th at 8	427	
III.	T Th at 8	428	
IV.	T Th at 9	20, Phys.	
V.	T Th at 9	402	
VI.	T Th at 10	20, Phys.	
VII.	T Th at 10	201	
VIII.	T Th at 10	217	
IX.	T Th at 11	20, Phys.	
X.	T Th at 11	205	
XI.	T Th at 11	409	

Course 2 must be preceded by Course 1, and by Course 2 in chemistry.

3*b* and 4. Beginning Laboratory Work. *Four hours.* Fee $3.00.
Consisting of mechanical and elementary electrical measurements, including the voltaic cell. Open to electrical engineers only.
Lectures and recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	W at 9	20, Phys.	
II.	F at 8	20, Phys.	
III.	W at 8	20, Phys.	
IV.	M at 8	20, Phys.	

Laboratory periods.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-5	Lab. A.	
II.	T Th 1-5	Lab. A.	
III.	T Th 1-5	Lab. B.	
IV.	W, 1-5 S, 8-12	Lab. A.	

Courses 3*b* and 4 must be preceded or accompanied by Course 2 and Course 2 in chemistry.

3*c*. Laboratory Work in Mechanical and Electrical Measurements. *Three hours.* Fee $3.00.
Laboratory periods.

SECTION	TIME	ROOM	INSTRUCTOR
I.	W, 2-5 S, 9-12	Lab. B.	

Course 3*c* must be preceded by Course 2.

12. Electrical Measurements.

Continuation of Course 5. *Three hours.* Fee $2.00.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M at 8	409	Dr. Smith.
II.	F at 2	409	Dr. Smith.

Laboratory periods.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 9-12	1-8	Dr. Smith.
II.	M, 2-4 F 3-6	1-8	Dr. Smith.
III.	T Th 2-5	1-8	Dr. Smith.
IV.	W, 2-4 S, 9-12	1-8	Dr. Smith.

18. Electrochemistry. *Three hours.* Fee $2.00.

Hours to be arranged. Prof. Carhart.

Course 18 must be preceded by Courses 3 and 4.

20. Mathematical Electricity and Magnetism. *Two hours.* (Elective.) Prof. Patterson.

Course 20 must be preceded by Course 2 and Mathematics 4 or 6.

CHEMISTRY

2. Principles of Inorganic Chemistry. *Four hours.*

Lectures W at 11, and S at 11. Lower Lecture Room, Old Medical Building. Mr. Smeaton.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F at 8	203, Ch.	Mr. Smeaton.
II.	T Th at 8	203, Ch.	Mr. Smeaton.
III.	M F at 9	203, Ch.	Mr. Moyer.
IV.	M F at 10	8, Ch.	Mr. Moyer.
V.	T Th at 10	8, Ch.	Mr. Moyer.
VI.	M F at 11	205, Ch.	Mr. Moyer.

2. *Lit.* Elementary Inorganic Chemistry. *Two hours.*

Lectures M and F at 11. Lower Lecture Room, Old Medical Building. Dr. Hale.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
A.	T at 11	205, Ch.	Dr. Hale.
B.	W at 11	205, Ch.	Dr. Hale.
C.	Th at 11	205, Ch.	Dr. Hale.

2*a*. *Lit.* Elementary Inorganic Chemistry. *Two hours.*
Two laboratory periods and one hour of recitation and laboratory work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M W	morning.	206 Ch.	
II.	T Th	morning.	211 Ch.	
III.*	M (1-3) W (1-4)		211 Ch.	Mr. Smeaton.
IV.	T Th	afternoon.	206 Ch.	
V.*	T (1-3) Th (1-4)		211 Ch.	Dr. Balcom.

*Sections III and V are for engineers. The others are for literary students.

3. Qualitative Analysis. *Seven hours.*
Sec. I. M W F at 8. Room 205 Ch. Prof. Johnson.
Four laboratory periods of three hours each. Open to those who have completed Course 2.

3*a*. Qualitative Analysis. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	205 Ch.	Prof. Johnson.
II.	M F at 9	205 Ch.	Mr. Willard.

Section II is for chemical engineers, and others may not be admitted without special permission.
Two laboratory periods of three hours each to be arranged. Open to those who have completed Course 2.

3*b*. Qualitative Analysis, continued. *Four hours.*
Sec. I. T Th at 9. Room 205 Ch. Prof. Johnson.
Two laboratory periods of three hours each to be arranged.
This is a continuation of Course 3*a*. Courses 3*a* and 3*b* are together equivalent to Course 3.

5. Quantitative Analysis. *Five hours.*
Sec. I. T Th at 9. Room 203 Ch.
Prof. Campbell and Mr. Zimmerschied.
Three laboratory periods of three hours each to be arranged.
Open to those who have completed Course 3. It may also be taken at the same time as Course 3*b*.

10. Chemistry of Carbon Compounds. *Four hours.*
M T W Th F at 9. Lower Lecture Room, Old Medical Building. Prof. Gomberg.
Course 10 must be preceded by Course 3 or 3*b*.

27. Chemistry of Rare Elements. *Four hours.*
Recitations and lectures *twice a week;* laboratory work, *twice a week, to be arranged.* Mr. Willard.
Course 27 must be preceded by Course 3 or 3*b*.

28. Advanced Quantitative Analysis. Laboratory Work. *Five hours.* Mr. Zimmerschied.
Hours to be arranged. Open to those who have completed Course 5.

29. Iron and Steel Analysis. Laboratory Work. *Five hours.* Professor Campbell.

    Open to those who have completed Course 28 and receive special permission.

31. Independent Work in Mineral Analysis. Laboratory Work. *Five hours.* Professor Campbell.

    Open to those who have completed Course 28.

35. Gas Analysis. Laboratory Work. *Two hours.* Assistant Professor White.

    Sec. I. M F 1-4. Room 6, Ch.

    Open to those who have completed Course 5.

38. Chemical Technology. Organic. *Five hours.*
    M T W Th F at 11. Room 203, Ch. Asst. Professor White.

    Open to those who have completed Course 33.

39. Chemical Technology. Laboratory Work. *Five hours.* Professor Campbell and others of the laboratory staff.

    Open to those who have completed Courses 28 and 33.

METALLURGY

2. Descriptive study of influence of heat and mechanical treatment upon metals and alloys. *One hour.*

   One lecture a week at hour to be arranged. Mr. Zimmerschied.

   Open to those who have completed Course 1.

3. Micrometallography. Laboratory Work. *One hour.*
   Laboratory period to be arranged. Mr. Zimmerschied.
   Must be preceded or accompanied by Course 2.

ASTRONOMY

2. General Astronomy. The Stellar System. *Two hours.*
   T Th at 10. Room 22, U. Professor Hussey.

3. Spherical and Practical Astronomy. Use of Sextant and Transit. *Two hours.*

   M W at 9. Room 22, U. Professor Hussey.

   Practice at Observatory during a portion of the semester.

4. Advanced Practical Course.

   Hours and credit to be arranged. Professor Hussey.

5. Theoretical Astronomy. *Four hours.*

   M T W Th at 11. Room 22, U. Professor Hussey.

   Must be preceded or accompanied by Mathematics 4.

6. Method of Least Squares. Theory of Errors and Adjustment of Observation. *Two hours.*

   M W at 10. Room 22, U. Professor Hussey.

MINERALOGY

1. Elements of Mineralogy. *Two hours.*
Lectures T Th at 9. Mineral. Lect. Room, T. H.
Assistant Professor Kraus.
In addition, two hours laboratory work a week, to be arranged.
A knowledge of elementary inorganic chemistry is necessary.

2. General Mineralogy. *Five hours.*
Lectures M T W Th F at 8. Asst. Professor Kraus.
Laboratory work, five hours a week, to be arranged.
Course 2 must be preceded by Courses 2 and 3 in chemistry.

3. Crystal Measurements. *Three hours.* Asst. Prof. Kraus.
Lectures and laboratory work, to be arranged.
Open to those who have completed Course 2.

4. Determinative Mineralogy. *Two hours.* Asst. Prof. Kraus.
Laboratory work, to be arranged.
Open to those who have completed Course 1.

5. Blowpipe Methods. *Two hours.*
Lectures M W at 9. Min. Lect. Room. Asst. Prof. Kraus.
In addition, two hours laboratory work, to be arranged.

6. Research Work. Credit to be arranged. Asst. Prof. Kraus.

GEOLOGY

6. Elements of Geology. Dynamic and Structural Geology. *Three hours.*
M W F at 11. Museum Lect. Room. Prof. Russell.

8. Elements of Geology. Historical Geology dealing principally with the geological history of the United States. *Three hours.*
M W F at 2. Museum Lect. Room. Prof. Russell.
A continuation of Course 1, but may be elected by students who have not taken that course.

9. Glacial Geology. *Two hours.*
T Th at 2. Museum Lect. Room. Prof. Russell.
Course 9 must be preceded by Course 1 or 6.

DRAWING

1. Geometrical Drawing. (Elective.) *Four hours.*
Sec. I. M T Th F from 2-4. Room 415. Mr. Palmer.

2. Free-Hand Drawing. (Elective.) *Three hours.*
Sec. I. M W F from 10-12. Room 35. Miss Hunt.

3. Free-Hand Drawing. (Advanced—Elective.) *Three hours.*
Sec. I. M W F from 10-12. Room 35. Miss Hunt.

4. Descriptive Geometry. *Four hours.*

SECTIONS		TIME		ROOM	INSTRUCTOR
I.	Recitation	M W F	at 8	428	Asst. Prof. Goulding.
	Drawing	Th	2-4	418	Mr. Bartlett.
II.	Recitation	T Th F	at 8	401	Mr. Bartlett.
	Drawing	M	1-3	418	Mr. Murphey.
III.	Recitation	T Th F	at 8	402	Mr. Murphey.
	Drawing	M	1-3	418	Mr. Murphey.
IV.	Recitation	M W F	at 8	427	Mr. Palmer.
	Drawing	Th	2-4	418	Mr. Bartlett.
V.	Recitation	M W F	at 9	427	Mr. Wilson.
	Drawing	S	8-10	403	Mr. Murphey.
VI.	Recitation	M W F	at 9	402	Mr. Murphey.
	Drawing	S	8-10	403	Mr. Murphey.
VII.	Recitation	M W F	at 10	402	Mr. Murphey.
	Drawing	W	2-4	418	Mr. Murphey.
VIII.	Recitation	M W F	at 10	427	Mr. Palmer.
	Drawing	W	2-4	418	Mr. Murphey.
IX.	Recitation	M W F	at 11	409	Prof. Denison.
	Drawing	S	10-12	403	Mr. Palmer.
X.	Recitation	T Th S	at 11	401	Mr. Bartlett.
	Drawing	W	2-4	415	Mr. Palmer.
XI.	Recitation	M W F	at 1	427	Mr. Wilson.
	Drawing	W	2-4	415	Mr. Palmer.

5. Advanced Projections and Stereotomy. ***Four hours.***

SECTIONS		TIME		ROOM	INSTRUCTOR
I.	Recitation	M T Th F	at 10	409	Prof. Denison.
	Drawing	S	8-12	415	Asst. Prof. Goulding.
II.	Recitation	M T Th F	at 10	428	Asst. Prof. Goulding.
	Drawing	S	8-12	415	Asst. Prof. Goulding.

7. Water-Color Drawing. (Elective.) ***Two hours.***
Sec. I. T Th 8-10 Room 35. **Miss Hunt.**

9a. Water-Color Drawing: Historic Ornament and Design. (Elective.) *Three hours.*
Sec. I. T Th 10-12 Room 35. **Miss Hunt.**
Additional time to be arranged.

10. Free-Hand Lettering. (Elective.) ***Two hours.***
Sec. I. T Th 2-4 Room 415. **Mr. Palmer.**

SHOP PRACTICE

1. Woodwork, Pattern-Making, Foundry, Forging and Metal Forming and Cutting Operations. ***Four hours.***
Fee $10.00. Mr. Purfield and Mr. McDonald.

SECTIONS	TIME		
I.	M F	7:30-12	**Quiz T at 1.**
II.	W S	7:30-12	**Quiz W at 1.**
III.	M F	1-5:30	**Quiz W at 2.**
IV.	T Th	1-5:30	**Quiz Th at 2.**
V.	T Th	7:30-12	**Quiz W at 10.**

2. **Pattern-Making and Foundry. (Advanced.)** ***Four hours.*** **Fee $10.00. Mr. Purfield and Mr. Bull.**

SECTIONS	TIME					
I.	M			F	1-5:30	Quiz T at 2.
II.		T	Th		1-5:30	Quiz F at 2.

3. Machine Shop. *Four hours.* Fee $10.00. Mr. Cobb.

SECTIONS	TIME					
I.	M			F	7:30-12	Quiz.
II.		T	Th		7:30-12	Quiz.
III.	M			F	1-5:30	Quiz.
IV.		T	Th		1-5:30	Quiz W at 2.

4. Pattern-Making, Foundry and Machine Shop. *Four hours.* Fee $10.00. Mr. Purfield, Mr. Bull and Mr. Cobb.

SECTIONS	TIME		
I.	W (1-5:30)	S (7:30-12)	Quiz Th at 1.

SURVEYING

1. Lectures. Text-book and Field Practice. *Five hours.*
   M T W Th F from 1-5. Room 301. Prof. Davis, Mr. Merrick and Mr. Atwell.
2. Topography, Transit and Stadia. Plane Table. Camera, Field Work and Drawing. *Five hours.*
   Lecture M T W Th F at 11. Room 301. Prof. Davis, Mr. Merrick and Mr. Atwell.
   Field Work and Drawing—
   M T W Th F from 1-6.
7. Geodesy, Geodetic Methods. *Three hours.*
   Sec. I. M W F at 8. Room 301. Prof. Davis.

CIVIL ENGINEERING

1. Structural Mechanics. *Five hours.* Must be preceded or accompanied by Course 5 in Mathematics.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th F at 9	301	Asst. Prof. Wrentmore.
II.	M T W Th F at 9	401	Mr. Tilden.
III.	M T W Th F at 10	301	Asst. Prof. Wrentmore.
IV.	M T W Th F at 11	203	Mr. Tilden.
V.	M T W Th F at 11	318	Mr. Wilson.

4. Engineering Construction. *Two hours.*
   Sec. I. M W F at 11 Room 205 Asst. Prof. Wrentmore.
   Course 4 must be preceded by Course 2.

5. Hydraulics. *Four hours.* Must be preceded or accompanied by Course 6 in Mathematics.

Lecture for all sections F at 10. Room 309. Prof. Williams.
Recitations—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 8	205	Mr. Wilson.
II.	M T W Th at 9	203	Asst. Prof. Greene.
III.	M T W Th at 10	205	Prof. Williams.
IV.	M T W Th at 10	203	Asst. Prof. Greene.

7. Water Supply Engineering. *Two hours.*

Sec. I. M T W Th F at 9 Room 205 Prof. Williams.
Course 7 must be preceded by Courses 1, 5 and 6.

8. Experimental Hydraulics. *Three hours.* Must be preceded by Course 5.

Hours to be arranged. Prof. Williams.

9. Advanced Structural Design. *Three hours.* Lectures, Computations and Drawing.

M W F 1-4 Room 307. Asst. Prof. Greene.
Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.

10. Testing Materials. *Two hours.* Must be preceded by Course 1.

Hours to be arranged.

MECHANICAL ENGINEERING

1. Principles of Mechanism. *Four hours.*

Lecture for all sections F at 9. Room 409. Prof. Denison.
Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T W Th at 8	409	Mr. Loomis.
II.	T W Th at 9	409	Prof. Denison.
III.	T W Th at 9	428	Asst. Prof. Goulding.
IV.	M W F at 1	401	Mr. Bartlett.
Drawing--			
I.	S 8-10	418	Mr. Bartlett.
II.	M 8-10	418	Mr. Bartlett.
III.	S 10-12	418	Mr. Murphey.
IV.	S 8-10	418	Mr. Bartlett.

3. Steam Engines and Other Heat Engines. *Four hours.*

Lecture for all sections W at 10. Room 309. Prof. Allen.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	219	Mr. Bursley.
II.	M T Th F at 10	219	Mr. Loomis.
III.	M T Th F at 10	401	Mr. Higbie.
IV.	M T Th F at 11	217	Mr. Bragg.

4. Machine Design. Machine Tools. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th 1-4	Shops	Supt. Miggett.
II.	M F 1-4	Shops	Supt. Miggett.
III.	W (1-4) S (8-11)	Shops	Supt. Miggett.

5. Thermo-dynamics. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 9	219	Asst. Prof. Anderson.
II.	M W F at 10	217	Asst. Prof. Anderson.

6. Theory Machine Design. *Three hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M W F at 10	318	Asst. Prof. Hazelton.

7. Steam Laboratory. Calibration of Instruments. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M 1-5:30		Mr. Higbie.
II.	T 1-5:30		Mr. Higbie.
III.	Th 1-5:30		Mr. Higbie.
IV.	S 8-12		Mr. Bursley.

8. Machine Design. Hoisting Machinery. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F 1-4	315	Mr. Loomis.
II.	T (1-4) Th (1-4) S (8-12)	315	Mr. Loomis.
III.	M W F 1-4	315	Asst. Prof. Hazelton.

9. Steam Laboratory. Testing of Engines and Boiler. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-5:30		Asst. Prof. Anderson.
II.	T Th 1-5:30		Mr. Bursley.
III.	W (1-5:30) S (8-12)		Mr. Higbie.

10. Machine Design. Engines and Boilers. *Two hours.*
Sec. I. T Th from 1-4. Room 315. Asst. Prof. Hazelton.

12. Power Plants. Power Transmission. *Two hours.*
Sec. I. T Th from 10-12. Room 309.
Prof. Cooley, Prof. Allen and Asst. Prof. Hazelton.

14. Compressed Air and Refrigeration. *Two hours.*
Sec I. T Th at 9. Room 217. Prof. Allen.

18. Thermodynamics. (Advanced.) Steam Turbines. *Two hours.*
Sec. I. M W at 9. Room 217. Prof. Allen.

21. Design of Power Plants. *Two hours.*
Sec. I. M W from 1-4. Room 202. Prof. Allen.

ELECTRICAL ENGINEERING

1. Dynamo-Electric Machinery. *Three hours.* Fee $1.00.
Lectures—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	201	Prof. Patterson.

Recitations. Prof. Patterson.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W at 8	201	Prof. Patterson.
II.	M W at 11	201	Prof. Patterson.

Laboratory Work—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	F 10-12	101	**Mr. Morehouse.**
II.	F 1-3	101	**Mr. Morehouse.**
III.	F 3-5	101	**Mr. Morehouse.**
IV.	S 8-10	101	**Mr. Bailey.**
V.	S 10-12	101	**Mr. Bailey.**

Course 1 must be preceded by Courses 1, 2, 3 and 4 (or 3*c*) in Physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. *Four hours.* **Fee $2.00.** Lectures and Recitations. **Prof. Patterson.**

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 9	201	**Prof. Patterson.**
II.	T Th at 11	201	**Prof. Patterson.**

Laboratory Periods—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M 1-5	101	**Prof. Patterson.**
II.	T 1-5	101	**Mr. Morehouse.**
III.	W 1-5	101	**Mr. Bailey.**
IV.	Th 1-5	101	**Mr. Morehouse.**

Course 2 must be preceded by Courses 1, 2, 3, 4 and 5 in Physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. *Two hours.* **Fee $1.00.**

Lectures and recitations—

Sec. I. F at 8. Room 201. **Prof. Patterson.**

Laboratory work—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M 1-4	102	**Mr. Bailey.**
II.	T 9-12	102	**Mr. Bailey.**
III.	Th 9-12	102	**Mr. Bailey.**

Course 4 must be preceded by Courses 1 and 3.

6. Design of Electrical Machinery and Appliances. Continuation of Course 5. Drawing. *Two hours.*

Sec. I. T Th 1-5. Room 202. **Mr. Bailey.**

8. Electric Railways. *Two hours.*

Lectures and recitations.

Sec. I. M F at 9. Room 201. **Prof. Patterson.**

Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. *Two hours.*

Lectures and reading.

Hours to be arranged. **Prof. Patterson.**

Course 10 must be preceded by Course 3.

12. **Distribution of Electricity.** ***Two hours.***
Lectures and recitations.
Sec. I. M W at 10. Room 201. Mr. Bailey.
Course 12 must be preceded by Course 1 or 3.

14. **Telephone and Telegraph and Related Apparatus.** ***Two hours.*** **Fee $2.00.**
Laboratory work.
Sec. I. M W 2-5. Room 111. Mr. Morehouse.
Course 14 must be preceded by Course 13.

IAVAL ARCHITECTURE AND MARINE ENGINEERING

2. **Naval Architecture. Ship Calculations.** ***Two hours.***
T Th at 9. Room 327. Prof. Sadler.

4. **Naval Architecture. Stability, Resistance and Propulsion of Ships.** ***Four hours.***
M T W Th at 10. Room 327. Prof. Sadler.

5. **Naval Architecture. Mould Loft and Structural Drawing.** ***Two hours.***
Sec. I. M F 1-4. Room 323. Prof. Sadler and Mr. Bragg.

7. **Naval Architecture. Ship Drawing and Design.** ***Three hours.***
Sec. I. M W F 1-4. Room 323. Prof. Sadler and Mr. Bragg.

9. Marine Engines. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	327	Mr. Bragg.
II.	T Th S at 11	327	Prof. Sadler.

11. Marine Engine and Boiler Drawing and Design. *Two hours.*
Sec. I. T Th 1-4. Room 323.

GYMNASIUM PRACTICE

Professor Fitzpatrick.

SECTIONS	TIME	
I. M	Th	11:15.
II. M	F	4:15.
III. T	Th	4:15.
IV. M	F	5:15.
V. T	Th	5:15.
VI. M	Th	8:00.

IV. OF MICH.
JUL 23 1906

UNIVERSITY BULLETIN

NEW SERIES, VOL. VII, NO. 13, JULY, 1906

UNIVERSITY OF MICHIGAN

DEPARTMENT OF ENGINEERING

GENERAL ANNOUNCEMENT
1906-1907

Ann Arbor
PUBLISHED BY THE UNIVERSITY
1906

UNIVERSITY OF MICHIGAN

Department of Engineering

GENERAL ANNOUNCEMENT
1906-1907

CATALOGUE OF STUDENTS FOR 1905-1906

REGISTER OF ALUMNI
CLASSES 1860 TO 1905 INCLUSIVE

1837

Ann Arbor, Mich.
PUBLISHED BY THE UNIVERSITY
1906

ERRATA

On page 29, Summer Session Fee, for § 91 read § 115.

On page 42, in the first paragraph last line, for page — read page 57.

On page 98, under New Order of Studies, the second line, for 1906 read 1905.

On page 100, under Mechanical, Second Year, First Semester, for Mechanics 3 read Mathematics 3.

On page 103, under Marine Engineering, Fourth Year, First Semester, for Marine Engineering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

On page 106, under Civil, Class of 1908, Third Year, First Semester, add Civil Engineering 1, 5 hours.

On page 107, under Mechanical, Classes of 1907 and 1908, First Semester, for Marine Engineering 3 read Marine Engineering 9.

On page 110, under Class of 1907, Fourth Year, First Semester, for Marine Engneering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

CONTENTS

PAGE

ANNOUNCEMENTS FOR 1906-1907 4
CALENDAR 5
BOARD OF REGENTS 6
MEMBERS OF THE FACULTY AND OTHER OFFICERS 7
DEPARTMENT OF ENGINEERING 15
    General Information 15
    Requirements for Admission 17
        On Diploma 18
        By Examination 20
        Examinations 22
        On Credits from Another College 24
        To Advanced Standing 24
        As Graduate Students 26
        As Special Students 27
FEES AND EXPENSES 27
OUTLINE OF PREPARATORY STUDIES 30
FELLOWSHIP IN GAS ENGINEERING 35
SCHOLARSHIPS 36
STUDENT EMPLOYMENT 36
SUGGESTIONS AND DIRECTIONS 36
RELATION OF STUDENTS TO THE CIVIL AUTHORITIES . . . 37
WITHDRAWAL FROM THE DEPARTMENT 37
THE WORK OF THE DEPARTMENT 38
FACILITIES FOR INSTRUCTION 56
SUMMER SESSION 65
COURSES OF INSTRUCTION 67
RULES GOVERNING ELECTION OF STUDIES 68
RULES RELATING TO EXAMINATIONS AND CONDITIONS . . . 69
SEQUENCE OF STUDIES 97
    New Order of Studies 98
    Old Order of Studies 105
REQUIREMENTS FOR GRADUATION 110
GRADUATE COURSES 115
SCHEDULE OF TERM EXAMINATIONS 116
REGISTER OF STUDENTS FOR YEAR 1905-1906 117
    Resident Graduates 117
    Candidates Studying in Absentia 117
    Undergraduates 118
SUMMARY OF STUDENTS 144
OFFICERS OF THE ALUMNI ASSOCIATION 145
REGISTER OF ALUMNI 147
INDEX TO REGISTER OF ALUMNI 247
GENERAL INDEX 257

Laboratory Work—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	F 10-12	101	Mr. Morehouse.
II.	F 1-3	101	Mr. Morehouse.
III.	F 3-5	101	Mr. Morehouse.
IV.	S 8-10	101	Mr. Bailey.
V.	S 10-12	101	Mr. Bailey.

Course 1 must be preceded by Courses 1, 2, 3 and 4 (or 3*c*) in Physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. *Four hours.* Fee $2.00.
Lectures and Recitations. Prof. Patterson.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 9	201	Prof. Patterson.
II.	T Th at 11	201	Prof. Patterson.

Laboratory Periods—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M 1-5	101	Prof. Patterson.
II.	T 1-5	101	Mr. Morehouse.
III.	W 1-5	101	Mr. Bailey.
IV.	Th 1-5	101	Mr. Morehouse.

Course 2 must be preceded by Courses 1, 2, 3, 4 and 5 in Physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. *Two hours.* Fee $1.00.
Lectures and recitations—
Sec. I. F at 8. Room 201. Prof. Patterson.
Laboratory work—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M 1-4	102	Mr. Bailey.
II.	T 9-12	102	Mr. Bailey.
III.	Th 9-12	102	Mr. Bailey.

Course 4 must be preceded by Courses 1 and 3.

6. Design of Electrical Machinery and Appliances. Continuation of Course 5. Drawing. *Two hours.*
Sec. I. T Th 1-5. Room 202. Mr. Bailey.

8. Electric Railways. *Two hours.*
Lectures and recitations.
Sec. I. M F at 9. Room 201. Prof. Patterson.
Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. *Two hours.*
Lectures and reading.
Hours to be arranged. Prof. Patterson.
Course 10 must be preceded by Course 3.

12. **Distribution of Electricity.** ***Two hours.***
Lectures and recitations.
Sec. I. M W at 10. Room 201. Mr. Bailey.
Course 12 must be preceded by Course 1 or 3.

14. **Telephone and Telegraph and Related Apparatus.** ***Two hours.*** **Fee $2.00.**
Laboratory work.
Sec. I. M W 2-5. Room 111. Mr. Morehouse.
Course 14 must be preceded by Course 13.

NAVAL ARCHITECTURE AND MARINE ENGINEERING

2. **Naval Architecture. Ship Calculations.** ***Two hours.***
T Th at 9. Room 327. Prof. Sadler.

4. **Naval Architecture. Stability, Resistance and Propulsion of Ships.** ***Four hours.***
M T W Th at 10. Room 327. Prof. Sadler.

5. **Naval Architecture. Mould Loft and Structural Drawing.** ***Two hours.***
Sec. I. M F 1-4. Room 323. Prof. Sadler and Mr. Bragg.

7. **Naval Architecture. Ship Drawing and Design.** ***Three hours.***
Sec. I. M W F 1-4. Room 323. Prof. Sadler and Mr. Bragg.

9. Marine Engines. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	327	Mr. Bragg.
II.	T Th S at 11	327	Prof. Sadler.

11. Marine Engine and Boiler Drawing and Design. *Two hours.*
Sec. I. T Th 1-4. Room 323.

GYMNASIUM PRACTICE

Professor Fitzpatrick.

SECTIONS		TIME	
I.	M	Th	11:15.
II.	M	F	4:15.
III.	T	Th	4:15.
IV.	M	F	5:15.
V.	T	Th	5:15.
VI.	M	Th	8:00.

UNIVERSITY BULLETIN

NEW SERIES, VOL. VII, NO. 13, JULY 1906

UNIVERSITY OF MICHIGAN

DEPARTMENT OF ENGINEERING

GENERAL ANNOUNCEMENT
1906-1907

Ann Arbor
PUBLISHED BY THE UNIVERSITY
1906

UNIVERSITY OF MICHIGAN

Department of Engineering

GENERAL ANNOUNCEMENT
1906-1907

CATALOGUE OF STUDENTS FOR 1905-1906

REGISTER OF ALUMNI
CLASSES 1860 TO 1905 INCLUSIVE

Ann Arbor, Mich.
PUBLISHED BY THE UNIVERSITY
1906

ERRATA

On page 29, Summer Session Fee, for § 91 read § 115.

On page 42, in the first paragraph last line, for page — read page 57.

On page 98, under New Order of Studies, the second line, for 1906 read 1905.

On page 100, under Mechanical, Second Year, First Semester, for Mechanics 3 read Mathematics 3.

On page 103, under Marine Engineering, Fourth Year, First Semester, for Marine Engineering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

On page 106, under Civil, Class of 1908, Third Year, First Semester, add Civil Engineering 1, 5 hours.

On page 107, under Mechanical, Classes of 1907 and 1908, First Semester, for Marine Engineering 3 read Marine Engineering 9.

On page 110, under Class of 1907, Fourth Year, First Semester, for Marine Engneering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

CONTENTS

PAGE

- Announcements for 1906-1907 4
- Calendar 5
- Board of Regents 6
- Members of the Faculty and Other Officers 7
- Department of Engineering 15
  - General Information 15
  - Requirements for Admission 17
    - On Diploma 18
    - By Examination 20
    - Examinations 22
    - On Credits from Another College 24
    - To Advanced Standing 24
    - As Graduate Students 26
    - As Special Students 27
- Fees and Expenses 27
- Outline of Preparatory Studies 30
- Fellowship in Gas Engineering 35
- Scholarships 36
- Student Employment 36
- Suggestions and Directions 36
- Relation of Students to the Civil Authorities . . . 37
- Withdrawal from the Department 37
- The Work of the Department 38
- Facilities for Instruction 56
- Summer Session 65
- Courses of Instruction 67
- Rules Governing Election of Studies 68
- Rules Relating to Examinations and Conditions . . . 69
- Sequence of Studies 97
  - New Order of Studies 98
  - Old Order of Studies 105
- Requirements for Graduation 110
- Graduate Courses 115
- Schedule of Term Examinations 116
- Register of Students for Year 1905-1906 117
  - Resident Graduates 117
  - Candidates Studying in Absentia 117
  - Undergraduates 118
- Summary of Students 144
- Officers of the Alumni Association 145
- Register of Alumni 147
- Index to Register of Alumni 247
- General Index 257

Announcements

1906-1907

1906.	
Feb. 9-10.	Examination for Admission.
Feb. 12.	SECOND SEMESTER BEGINS.
April 13.	(Evening.) Recess begins, ending Apri (evening).
June 19.	Class Day.
June 20.	Alumni Day.
June 21.	COMMENCEMENT IN ALL DEPARTMENTS.
June 22 to Sept. 24.	Summer Vacation.
June 25 to Aug. 3.	Summer Session of the Department of neering and of the Department of Li ture, Science, and the Arts.
Sept. 19 to 2.	*Examination for admission to the Depart of Engineering.*
Sept. 22	Classification of First Year Students.
Sept.	Classification of Second, Third, and F Year Students.
Sept.	FIRST SEMESTER BEGINS IN ALL DEPARTM
Sept. 2	Classes commence work.
Nov. —	Thanksgiving Recess of three days, begin Tuesday evening.
Dec. 21.	(Evening.) Holiday Vacation begins.
1907.	
Jan 8.	Exercises resumed after Holiday Vacatio
Feb. 8.	(Evening.) FIRST SEMESTER CLOSES.
Feb. 8-9.	*Examination for Admission.*
Feb. 11.	SECOND SEMESTER BEGINS.
April 12.	(Evening.) Recess begins, ending Apri (evening).
June 20.	COMMENCEMENT IN ALL DEPARTMENTS.

1906

JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

FEBRUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

MARCH

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

APRIL

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

MAY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JUNE

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

AUGUST

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

OCTOBER

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

NOVEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

DECEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

1907

JANUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

FEBRUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

MARCH

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JULY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

NOVEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

UNIV. OF MICH.
JUL 23 1906

UNIVERSITY BULLETIN

NEW SERIES, VOL. VII, NO. 13, JULY, 1906.

UNIVERSITY OF MICHIGAN

DEPARTMENT OF ENGINEERING

GENERAL ANNOUNCEMENT
1906-1907

Ann Arbor
PUBLISHED BY THE UNIVERSITY
1906

UNIVERSITY OF MICHIGAN

Department of Engineering

GENERAL ANNOUNCEMENT
1906-1907

CATALOGUE OF STUDENTS FOR 1905-1906

REGISTER OF ALUMNI
CLASSES 1860 TO 1905 INCLUSIVE

1837

Ann Arbor, Mich.
PUBLISHED BY THE UNIVERSITY
1906

ERRATA

On page 29, Summer Session Fee, for § 91 read § 115.

On page 42, in the first paragraph last line, for page — read page 57.

On page 98, under New Order of Studies, the second line, for 1906 read 1905.

On page 100, under Mechanical, Second Year, First Semester, for Mechanics 3 read Mathematics 3.

On page 103, under Marine Engineering, Fourth Year, First Semester, for Marine Engineering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

On page 106, under Civil, Class of 1908, Third Year, First Semester, add Civil Engineering 1, 5 hours.

On page 107, under Mechanical, Classes of 1907 and 1908, First Semester, for Marine Engineering 3 read Marine Engineering 9.

On page 110, under Class of 1907, Fourth Year, First Semester, for Marine Engneering 8, 2 hours read Marine Engineering 8, 1 hour, and for Marine Engineering 10, 1 hour read Marine Engineering 10, 2 hours.

CONTENTS

PAGE
- Announcements for 1906-1907 . . . 4
- Calendar . . . 5
- Board of Regents . . . 6
- Members of the Faculty and Other Officers . . . 7
- Department of Engineering . . . 15
  - General Information . . . 15
  - Requirements for Admission . . . 17
    - On Diploma . . . 18
    - By Examination . . . 20
    - Examinations . . . 22
    - On Credits from Another College . . . 24
    - To Advanced Standing . . . 24
    - As Graduate Students . . . 26
    - As Special Students . . . 27
- Fees and Expenses . . . 27
- Outline of Preparatory Studies . . . 30
- Fellowship in Gas Engineering . . . 35
- Scholarships . . . 36
- Student Employment . . . 36
- Suggestions and Directions . . . 36
- Relation of Students to the Civil Authorities . . . 37
- Withdrawal from the Department . . . 37
- The Work of the Department . . . 38
- Facilities for Instruction . . . 56
- Summer Session . . . 65
- Courses of Instruction . . . 67
- Rules Governing Election of Studies . . . 68
- Rules Relating to Examinations and Conditions . . . 69
- Sequence of Studies . . . 97
  - New Order of Studies . . . 98
  - Old Order of Studies . . . 105
- Requirements for Graduation . . . 110
- Graduate Courses . . . 115
- Schedule of Term Examinations . . . 116
- Register of Students for Year 1905-1906 . . . 117
  - Resident Graduates . . . 117
  - Candidates Studying in Absentia . . . 117
  - Undergraduates . . . 118
- Summary of Students . . . 144
- Officers of the Alumni Association . . . 145
- Register of Alumni . . . 147
- Index to Register of Alumni . . . 247
- General Index . . . 257

Board of Regents

JAMES B. ANGELL, LL.D.,
PRESIDENT.

		Term Expires
HON. HENRY S. DEAN,	*Ann Arbor,*	Dec. 31, 1907
HON. LEVI L. BARBOUR,	*Detroit,*	" 1907
HON. FRANK W. FLETCHER,	*Alpena,*	" 1909
HON. FRANK W. CAREY,	*Manistee,*	" 1909
HON. LOYAL E. KNAPPEN,	*Grand Rapids,*	" 1911
HON. PETER WHITE,	*Marquette,*	" 1911
HON. ARTHUR HILL,	*Saginaw,*	" 1913
HON. WALTER H. SAWYER,	*Hillsdale,*	" 1913

JAMES H. WADE,
SECRETARY.

HARRISON SOULE,
TREASURER.

HON. PATRICK H. KELLEY,
SUPERINTENDENT OF PUBLIC INSTRUCTION.
(Office at Lansing.)

Members of the Faculty

AND OTHER OFFICERS*

JAMES BURRILL ANGELL, LL.D., PRESIDENT.
South University Avenue.

MORTIMER ELWYN COOLEY, M.E., *Professor of Mechanical Engineering and Dean of the Department of Engineering.*
314 North Ingalls Street.

CHARLES SIMEON DENISON, M.S., C.E., *Professor of Stereotomy, Mechanism, and Drawing.* 502 East Huron Street.

HENRY SMITH CARHART, LL.D., *Professor of Physics and Director of the Physical Laboratory.* 521 Monroe Street.

RAYMOND CAZALLIS DAVIS, A.M., *Librarian Emeritus and Lecturer on Bibliography.* 521 Church Street.

HENRY CARTER ADAMS, PH.D., LL.D., *Professor of Political Economy and Finance.* 1421 Hill Street.

FRANCIS WILLEY KELSEY, PH.D., *Professor of the Latin Language and Literature.* 826 Tappan Street.

JEROME CYRIL KNOWLTON, A.B., LL.B., *Marshall Professor of Law.* 1429 Hill Street.

OTIS COE JOHNSON, PH.C., A.M., *Professor of Applied Chemistry.* 730 South Thayer Street.

JOSEPH BAKER DAVIS, C.E., *Professor of Geodesy and Surveying and Associate Dean of the Department of Engineering.* 731 South Ingalls Street.

ROBERT MARK WENLEY, SC.D., LL.D., *Professor of Philosophy.* 509 East Madison Street.

‡FRED NEWTON SCOTT, PH.D., *Professor of Rhetoric.*

EDWARD DEMILLE CAMPBELL, B.S., *Director of the Chemical Laboratory and Professor of Chemical Engineering and Analytical Chemistry.* 1555 Washtenaw Avenue.

FILIBERT ROTH, B.S., *Professor of Forestry.*
730 South State Street.

---

*In this list are included the names of a few officers and instructors with whom engineering students may have occasion to confer.

‡Absent on leave.

FRED MANVILLE TAYLOR, PH.D., *Professor of Political Economy and Finance.* 527 Church Street.

ALEXANDER ZIWET, C.E., *Professor of Mathematics, in charge of Mathematics in this Department.* 644 South Ingalls Street.

HERBERT CHARLES SADLER, ScD., *Professor of Naval Architecture.* 705 South State Street.

KEENE FITZPATRICK, *Professor of Physical Training and Director of the Waterman Gymnasium.* 719 East University Avenue.

GARDNER STEWART WILLIAMS, C.E., *Professor of Civil, Hydraulic, and Sanitary Engineering.* 1503 Washtenaw Avenue.

MOSES GOMBERG, ScD., *Professor of Organic Chemistry.* 841 East University Avenue.

GEORGE WASHINGTON PATTERSON, PH.D., *Professor of Electrical Engineering.* 814 South University Avenue.

JOHN OREN REED, PH.D., *Professor of Physics, and Dean of the Summer Session.* 907 Lincoln Avenue.

THEODORE WESLEY KOCH, A.M., *Librarian.* 620 South State Street.

WILLIAM JOSEPH HUSSEY, B.S., *Professor of Astronomy and Director of the Observatory.* *The Observatory.*

EMIL LORCH, A.M., *Professor of Architecture.*

ARTHUR FAIRBANKS, PH.D., *Professor of Greek Language and Archaeology.*

JOHN ROBINS ALLEN, M.E., *Junior Professor of Mechanical Engineering.* 226 South Ingalls Street.

JOSEPH LYBRAND MARKLEY, PH.D., *Junior Professor of Mathematics.* 1320 South University Avenue.

GEORGE REBEC, PH.D., *Junior Professor of Philosophy.* 1003 Packard Street.

EDWARD DAVID JONES, PH.D., *Junior Professor of Commerce and Industry.* 919 Oakland Avenue.

WILLIAM LINCOLN MIGGETT, M.E., *Superintendent of Engineering Shops.* 432 Hamilton Place.

HENRY CLAY ANDERSON, M.E., *Junior Professor of Mechanical Engineering.* 331 East Jefferson Street.

EDWARD HENRY KRAUS, PH.D., *Junior Professor of Mineralogy.* 548 Thompson Street.

CLARENCE GEORGE WRENTMORE, C.E., *Assistant Professor of Civil Engineering.* 933 Forest Avenue.

JAMES WATERMAN GLOVER, PH.D., *Assistant Professor Mathematics.* 1312 Geddes Avenue.

ALBERT EMERSON GREENE, PH.B., B.S., *Assistant Professor of Civil Engineering.* 415 East William Street.

WILLIAM HENRY WAIT, PH.D., *Assistant Professor of Modern Languages, in Charge of Modern Language Work in the Department of Engineering.* 904 Olivia Avenue.

HERBERT JAY GOULDING, B.S., *Assistant Professor of Descriptive Geometry and Drawing.* 904 Lincoln Avenue.

ALFRED HOLMES WHITE, A.B., B.S., *Assistant Professor of Chemical Technology.* 1017 Hill Street.

WILLIAM SYLVESTER HAZELTON, A.B., B.S., *Assistant Professor of Mechanical Engineering.* 824 East University Avenue.

HOWARD B. MERRICK, B.S., *Assistant Professor of Surveying.* 928 Church Street.

WILLIAM HENRY BUTTS, A.M., *Assistant Professor of Mathematics.* 919 Oakland Avenue.

HARRISON McALLISTER RANDALL, PH.D., *Assistant Professor of Physics.* 1220 Prospect Street.

LYMAN FOOTE MOREHOUSE, A.M., *Assistant Professor of Electrical Engineering.* 923 Greenwood Avenue.

CHARLES JOSEPH TILDEN, B.S., *Assistant Professor of Civil Engineering.* 1002 Cornwell Place.

BENJAMIN FRANKLIN BAILEY, A.M., *Assistant Professor of Electrical Engineering.* 319 East William Street.

Non-Resident Lecturers on Special Topics for 1905-1906

LEWIS M. HAUPT, A.M., C.E., *Commercial Waterways.* 107 North 35th Street, Philadelphia, Pa.

DAVID H. BROWNE, PH.B., *Metallurgy of Nickel and Copper.* Copper Cliffs, Ontario.

SAMUEL S. WYER, M.E., *Producer Gas and Gas Producers.* 1210 Highland Street, Columbus, Ohio.

†Instructors and Assistants

ARTHUR WHITMORE SMITH, Ph.D., *Instructor in Physics.*
1008 Oakland Avenue.

FREDERICK CHARLES WILSON, B.S., *Instructor in Civil Engineering.*
912 Forest Avenue.

ARCHIE BURTON PIERCE, Ph.D., *Instructor in Mathematics.*
403 East Washington Street.

THEODORE RUDOLPH RUNNING, Ph.D., *Instructor in Mathematics.*
1108 Prospect Street.

LOUIS CHARLES KARPINSKI, Ph.D., *Instructor in Mathematics.*
735 South Twelfth Street.

PETER FIELD, Ph.D., *Instructor in Mathematics.*
935 Greenwood Avenue.

EDWARD BRIND ESCOTT, M.S., *Instructor in Mathematics.*
1825 Hill Street.

‡WILLIAM MARSHALL, M.S., *Instructor in Mathematics.*

WILLIAM GABB SMEATON, A.B., *Instructor in Chemical Engineering.*
1009 Michigan Avenue.

EDWARD MILTON BRAGG, B.S., *Instructor in Marine Engineering and Naval Architecture.*
718 South Ingalls Street.

WILLIAM JAY HALE, Ph.D., *Instructor in General Chemistry.*
633 Church Street.

ALICE LOUISE HUNT, *Instructor in Drawing.*
526 Church Street.

GEORGE MILLER BARTLETT, B.S., A.M,, *Instructor in Descrictive Geometry and Drawing.*
1321 Wilmot Street.

HENRY WILLIAM DUBEE, A.M., *Instructor in German.*
1036 Oakland Avenue.

HARRISON STANDISH SMALLEY, Ph.D., *Instructor in Political Economy.*
544 Thompson Street.

JAMES PYPER BIRD, A.B., *Instructor in French and Spanish, and Secretary of the Department of Engineering.*
711 Twelfth Street.

JOSEPH ALDRICH BURSLEY, B.S., *Instructor in Mechanical Engineering.*
1224 Washtenaw Avenue.

EDWARD LARRABEE ADAMS, A.M., *Instructor in Romance Languages.*
644 South Ingalls Street.

†Additional Assistants are to be appointed as the work may demand.
‡Absent on leave.

WILLIAM D. HENDERSON, Ph.D., *Instructor in Physics.* 609 Hill Street.

FREDERICK JACOB MENGER, Jr., A.M., *Instructor in German.* 734 East University Avenue.

JOHN WILLIAM BRADSHAW, Ph.D., *Instructor in Mathematics, and Registrar of the Department of Literature, Science, and the Arts.* 530 Hill Street.

H. HAROLD HIGBEE, E.E., *Instructor in Electrical Engineering.* 802 Monroe Street.

WILLIAM EDWARD BOHN, Ph.D., *Instructor in Rhetoric.* 718 Monroe Street.

WALTER BURTON FORD, Ph.D., *Instructor in Mathematics.* 617 Forest Avenue.

RUBEN WILFORD BALCOM, Ph.D., *Instructor in Analytical Chemistry.* 802 Monroe Street.

HERBERT ALDEN KENYON, A.M., *Instructor in French and Spanish.* 1118 South University Avenue.

‡HOBART HURD WILLARD, A.B., *Instructor in Analytical Chemistry.*

KARL WILHELMJ ZIMMERSCHIED, A.B., M.S., *Instructor in Metallurgy and Quantitative Analysis.* 522 Monroe Street.

HARRY H. ATWELL, B.S., *Instructor in Surveying.* 623 South Division Street.

CLYDE ELTON LOVE, A.B., *Instructor in Mathematics.* 1113 Willard Street.

WILLIAM VAN NEST GARRETSON, M.S., *Instructor in Mathematics.* 715 Monroe Street.

HAROLD PRELL BREITENBACH, A.M., *Instructor in Rhetoric.* 639 South Twelfth Street.

HENRY PRIME NOBLE, Ph.B., *Instructor in Machine Design, and Assissant to the Superintendent of Shops.* 325 East Jefferson Street.

CHARLES L. HARPHAM, A.B., *Instructor in Accounting in the Department of Political Economy.* 102 Twelfth Street.

*——————, ———., *Instructor in Surveying.*
——————.

WALTER TURNER FISHLEIGH, A.B., B.S., *Instructor in Descriptive Geometry and Drawing.* 219 S. Thayer Street.

---

*Vacancy to be filled.
‡Absent on leave.

——————, ———., *Instructor in Descriptive Geometry and Drawing.*
——————.

——————, ———., *Instructor in Descriptive Geometry and Drawing.*
——————.

——————, ———., *Instructor in Descriptive Geometry and Drawing.*
——————.

——————, ———., *Instructor in Civil Engineering.*
——————.

JOHN EDWARD EMSWILER, M.E., *Instructor in Mechanical Engineering.*
——————.

——————, ———., *Instructor in Mechanical Engineering.*
——————.

——————, ———., *Instructor in Electrical Engineering.*
——————.

——————, ———., *Instructor in Mathematics.*
——————.

OTTO C. MARCKWARDT, A.M., *Instructor in Rhetoric.*
——————.

WALTER FRED HUNT, A.M., *Instructor in Mineralogy.*
——————.

EDWARD JAMES CREIGHTON, B.S., *Instructor in Surveying.* Summer Session.

ROSS DANIEL HILDEBRANT, B.S., *Instructor in Surveying.* Summer Session.

FREDERICK EVOY KNEIP, B.S., *Instructor in Surveying.* Summer Session.

HUGH JOHN LUMSDEN, B.S., *Instructor in Surveying.* Summer Session.

PERCY AUSTIN PALMER, B.S., *Instructor in Surveying.* Summer Session.

HORACE PATTON RAMEY, *Instructor in Surveying.* Summer Session.

GUY WHITCOMB JOCLYN, *Assistant in Surveying.*
514 East Liberty Street.

JAMES DUNCAN KNAPP LYMAN, A.B., *Assistant in Surveying.*
513 Elm Street.

EARL MICHAEL NISEN, *Assistant in Surveying.*
321 South Division Street.

WILLIAM JAMES FAIRBAIRN WARD, *Assistant in Surveying.*
513 Elm Street.

ROBERT CLYDE MAXWELL, *Assistant in Surveying.*
611 Church Street.

ADELBERT PHILO MILLS, B.S., *Assistant in Civil Engineering.*
1011 Monroe Street.

RALPH BENJAMIN WILEY, B.S., *Assistant in Civil Engineering.*
226 Twelfth Street.

*——————, ———., *Assistant in Civil Engineering.*
——————.

*——————, ———., *Assistant in Civil Engineering.*
——————.

AUGUSTUS CARRIER, PH.G., *Assistant in Mechanical Engineering.*
1208 Willard Street.

HAROLD SAYRE WHEELER, B.S., *Assistant in Mechanical Engineering.*
508 Thompson Street.

RALZEMOND D. PARKER, B.S., *Assistant in Mechanical Engineering.*
308 Madison Street.

JOHN JOSEPH WOOLFENDEN, B.S., *Assistant in Mechanical Engineering.*
1227 South University Avenue.

ARTHUR D. SPENCER, B.S., *Assistant in Electrical Engineering.*
837 East University Avenue.

*——————, ———., *Assistant in Electrical Engineering.*
——————.

MARCUS THOMPSON LOTHROP, B.S., *Assistant in Chemical Technology.*
1007 East Huron Street.

EDWIN FOY HYLAND, *Assistant in Gas Analysis.*
513 Thompson Street.

KINSLEY NAPIER CLARKE, B.S., *Assistant in Marine Engineering.*
426 North Ingalls Street.

FRANK JOHN MELLENCAMP, A.M., *Assistant in Physics.*
934 South State Street.

HARRY NEWTON COLE, A.B., *Assistant in Physics.*
702 Forest Avenue.

FRANK EUGENE ANDREWS, A.M., *Assistant in Physics.*
516 Cheever Court.

WALTER FRANCIS COLBY, A.B., *Assistant in Physics.*

FRANK BURTON, *Assistant in Quantitative Analysis.*
710 East Ann Street.

——————.

---

* Vacancy to be filled.

JOHN ARTHUR FISHLEIGH, Jr., *Assistant in Descriptive Geometry.* 219 South Thayer Street.

ERNEST McPHERSON SIMS, A.B., *Assistant in Descriptive Geometry and Drawing.* 909 East Washington Street.

JUSTIN THOMAS KINGDON, *Assistant to the Associate Dean.* 616 East Huron Street.

*——————, ———., *Assistant in Surveying.* Summer Session.

*——————, ———., *Assistant in Surveying.* Summer Session.

IRVING DAY SCOTT, A.B., *Assistant in Mineralogy.* ——————.

ROBERT W. CLARK, *Assistant in Mineralogy.* ——————.

PHILIP A. ZANG, *Assistant in Mineralogy.* ——————.

L. COLEMAN LUDLUM, *Assistant in Mineralogy.* ——————.

GEORGE B. DENTON, *Assistant in Rhetoric.* ——————.

Instructors and Assistants in the Engineering Shops

HORACE TRAITON PURFIELD, *Instructor in Carpentry and Pattern-making.* 630 South Twelfth Street.

WILLIAM ROBERTSON McDONALD, *Instructor in Forging.* 1114 East University Avenue.

HARRY MANN COBB, *Instructor in the Machine Shop.* 524 Hill Street.

GEORGE GARFIELD BULL, *Instructor in the Foundry.* 1109 Broadway.

JOHN H. STEVENSON, *Instrument Maker.* 1117 West Huron Street.

ALONZO SIMMONS BERRY, *Assistant Instructor in Carpentry.* 929 Olivia Place.

EMORY MORRIS SWEET, *Assistant Instructor in the Machine Shop.* 302 South State Street.

ALEXANDER ST. CLAIR, *Assistant Instructor in Forging.* 413 West Liberty Street.

THOMAS BURRIS, *Assistant Instructor in Foundry Practice.* 1427 Broadway.

KARL MANSFIELD WISE, *Assistant to the Superintendent of Shops.*

---

*Vacancy to be filled.

Department of Engineering

GENERAL INFORMATION

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental announcement. The various Faculties include about two hundred officers of instruction, besides nearly one hundred assistants, some of whom participate in the work of teaching. Forty-five hundred and seventy-one students, representing all the States and Territories and many foreign countries, are in attendance.

In the legislative act under which the University was organized in 1837, provision was made for instruction in engineering. There are few older technical schools in the United States. Work was begun in this line in 1853, and the first degrees were conferred in 1860. The engineering courses were included in the Department of Literature, Science, and the Arts, until the close of the collegiate year 1894-95. At that time the Department of Engineering was established by the Board of Regents.

This Department has enrolled at present eleven hundred and fifty-six students, pursuing work in different engineering lines. In this number are not included those studying chemistry and other branches of science.

Persons who wish to become professional engineers are offered here thorough courses of study in civil, mechanical, electrical, and chemical engineering, naval

JOHN ARTHUR FISHLEIGH, Jr., ***Assistant in Descriptive Geometry.*** **219 South Thayer Street.**

ERNEST McPHERSON SIMS, A.B., ***Assistant in Descriptive Geometry and Drawing.*** **909 East Washington Street.**

JUSTIN THOMAS KINGDON, ***Assistant to the Associate Dean.*** **616 East Huron Street.**

*————————, ————., ***Assistant in Surveying.*** **Summer Session.**

*————————, ————., ***Assistant in Surveying.*** **Summer Session.**

IRVING DAY SCOTT, A.B., ***Assistant in Mineralogy.***
————————.

ROBERT W. CLARK, ***Assistant in Mineralogy.***
————————.

PHILIP A. ZANG, ***Assistant in Mineralogy.***
————————.

L. COLEMAN LUDLUM, ***Assistant in Mineralogy.***
————————.

GEORGE B. DENTON, ***Assistant in Rhetoric.***
————————.

Instructors and Assistants in the Engineering Shops

HORACE TRAITON PURFIELD, ***Instructor in Carpentry and Pattern-making.*** **630 South Twelfth Street.**

WILLIAM ROBERTSON McDONALD, ***Instructor in Forging.*** **1114 East University Avenue.**

HARRY MANN COBB, ***Instructor in the Machine Shop.*** **524 Hill Street.**

GEORGE GARFIELD BULL, ***Instructor in the Foundry.*** **1109 Broadway.**

JOHN H. STEVENSON, ***Instrument Maker.*** **1117 West Huron Street.**

ALONZO SIMMONS BERRY, ***Assistant Instructor in Carpentry.*** **929 Olivia Place.**

EMORY MORRIS SWEET, ***Assistant Instructor in the Machine Shop.*** **302 South State Street.**

ALEXANDER ST. CLAIR, ***Assistant Instructor in Forging.*** **413 West Liberty Street.**

THOMAS BURRIS, ***Assistant Instructor in Foundry Practice.*** **1427 Broadway.**

KARL MANSFIELD WISE, ***Assistant to the Superintendent of Shops.***

*Vacancy to be filled

Department of Engineering

GENERAL INFORMATION

The University of Michigan is a part of the educational system of the State, and derives from the State, in one way or another, the greater part of its revenue. The University comprises the Department of Literature, Science, and the Arts, and six professional schools, each of which has its own Faculty and issues each year a separate departmental announcement. The various Faculties include about two hundred officers of instruction, besides nearly one hundred assistants, some of whom participate in the work of teaching. Forty-five hundred and seventy-one students, representing all the States and Territories and many foreign countries, are in attendance.

In the legislative act under which the University was organized in 1837, provision was made for instruction in engineering. There are few older technical schools in the United States. Work was begun in this line in 1853, and the first degrees were conferred in 1860. The engineering courses were included in the Department of Literature, Science, and the Arts, until the close of the collegiate year 1894-95. At that time the Department of Engineering was established by the Board of Regents.

This Department has enrolled at present eleven hundred and fifty-six students, pursuing work in different engineering lines. In this number are not included those studying chemistry and other branches of science.

Persons who wish to become professional engineers are offered here thorough courses of study in civil, mechanical, electrical, and chemical engineering, naval architecture, marine engineering, architecture, and architectural engineering. The work extends through four years, and leads to the degree of Bachelor of Science. The degrees of Master of Science, Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Naval Architect, Marine Engineer, Architect, and Architectural Engineer are given for graduate work. The aim of the department is to lay a foundation of sound theory, sufficiently broad and deep to enable its graduates to enter understandingly on the further investigation of the several specialties of the engineering profession; and at the same time to impart such a knowledge of the usual professional practice as shall make its students useful in any position to which they may be called. While the adaptation of theory to practice can be thoroughly learned only by experience, there are many matters in which the routine work of an engineering field party, office, or drafting room can be carried out on a greater or less scale in a training school. *The technical branches are under the direct care of those who have had professional experience as well as a full scientific training.* The instructors who have the several branches in charge aim to fit the students, as far as possible, for the requirements of active practice.

The chemical engineering course is designed to meet the demand of manufacturers for men capable of intelligently directing manufacturing processes and handling machinery. To this end sufficient chemistry is introduced into the course to enable the graduate to act as his own chemist on most occasions. The instruction includes thorough laboratory drill in qualitative and quantitative analysis, courses in organic chemistry, chemical technology, metallurgy, and a special laboratory course in connection with some chosen manufacturing industry. The engineering studies are, in the main, those required for the course in mechanical engineering; the student gains a knowledge of the construction and use of machinery, and has practical drill in the drawing rooms and shops; but the chemical studies indicated above take the place of the advanced mathematics and the higher work in engineering design.

The work for the first year is the same for all students. At the end of the first year the student makes his choice to continue in the civil engineering, the mechanical engineering, the electrical engineering, the chemical engineering, naval architecture, the marine engineering, architecture, or architectural engineering course. The Order of Studies, given in §§ 150-163, is the one recommended by the Department; and the days and hours assigned to the different exercises each year in the Special Program are planned to avoid conflicts. A student can, however, deviate from this printed order, if his preparation for a given study meets the requirements prescribed by the instructor, and if he assumes all risk of interference of hours in subsequent semesters.

No marked distinction between first year, second year, etc., is made; but a student is recommended for a particular degree when he has successfully completed the requirements for the same, as laid down in §§ 164-170.

The academic year extends from the Tuesday preceding the last Wednesday in September to the Thursday preceding the last Wednesday in June (September 25, 1906, to June 20, 1907). The summer session, between the student's first and second, second and third, or third and fourth years, extends six weeks, from Monday following Commencement, June 25 to August 3, 1906. See §§ 151-163.

Copies of the University Calendar describing the different Departments, and containing a catalogue of all the students, will be mailed by James H. Wade, secretary of the University, on request.

REQUIREMENTS FOR ADMISSION

1. Applicants for admission must be at least sixteen years of age, and must present satisfactory evidence of good moral character. They must bring credentials from their last instructor, from the last school attended, or from their last employer.

2. Applicants may be admitted on diploma; by exan ination; on credits from another college; or by a con bination of these. They are also admitted to advance standing; as graduate students; and as special students.

ADMISSION ON DIPLOMA

3. Applicants presenting graduation certificates fro any of the schools officially approved by the Faculty of th Department of Literature, Science, and the Arts, signe by the superintendent or the principal of the schoo are admitted without examination to the Department c Engineering. But if such certificate, though it mig admit a student to the Department of Literature, Scienc and the Arts, shows any deficiencies in the requiremen for admission to the Department of Engineering, as f example, plane trigonometry or chemistry, such deficie cies must be made up, or substitutions secured at th time of entrance. Extra studies may be credited o advanced standing, if the subjects are taught in eith of the two departments.

The certificate must state that the applicant has su tained his examinations in all the studies prescribed f admission to the Department of Engineering, or for th fifteen units of credit prescribed for admission to th Department of Literature, Science, and the Arts, and recommended for admission to the University. It mu be presented to the Associate Dean of the Departme within a year and three months after graduation from t school, and the student must then begin his work.

The approved schools of the University of Michig do not necessarily include those accredited to or affiliat with other Universities or Colleges.

Diplomas and sixty-count academic certificates issued by Regents of the University of the State of New York are accep by the Department of Engineering in place of examinations in

the subjects required for entrance which are covered by such credentials, provided not more than fifteen months have elapsed since the applicant graduated from school. A statement from the teacher, giving in detail the work done and the proficiency attained in these subjects, must be submitted by the holder of these credentials.

No other credentials, including pass-cards and certificates, issued by the Regents, are accepted, unless they are presented by the holder of a Regents' diploma or sixty-count academic certificate.

Students, who for any reason have failed to secure certificate of graduation from an approved school and principal's recommendation, will be required to pass the regular examinations for entrance in all subjects. (See §§ 4-5.)

Those desiring to enter on diploma should present their credentials, including those mentioned in § 1, at the office of the Associate Dean, Room 4, Old Engineering Building, not later than September 17 or 18, if desiring to enter the first semester, or February 6 if desiring to enter the second semester. It is better to mail the credentials, as long before these dates as practicable, to the Associate Dean. They will be examined, placed on file, and a receipt for them mailed to the sender. If admitted, the applicant will be informed.

Certificates from schools other than those officially examined and approved by the University, as specified in § 3, will not excuse applicants from admission examinations, unless such certificates be accompanied by satisfactory evidence that the school issuing them is equal in grade to the approved schools.

Applicants who have satisfied the requirements for admission to the Department of Literature, Science, and the Arts are admitted to this department, but must make up their deficiencies in *plane trigonometry* and *science,* if such deficiencies exist. The fifteen units required must include three units in English Composition and Literature, three units in Mathematics, one unit in Physics, and at least two units in Latin, French, or German. The other six units may be selected by the applicant from the list of requirements for admission to the Department of Literature, Science, and the Arts.

A unit is a subject of study pursued through a school year of thirty-six weeks, with not less than four recitation periods each week.

ADMISSION BY EXAMINATION

4. Examinations for entrance are in charge of an Examining Board, consisting of five members of the Engineering Faculty, who submit to the Associate Dean a list of all applicants recommended for admission upon examination.

Before entering upon the examination each applicant must present his credentials to the Associate Dean of the Department at his office, Room 4, in the Old Engineering Building.

Specimen entrance examination questions are not furnished.

Fifteen units are required for admission. A unit means the study of a subject four class periods a week for at least thirty-six weeks. Eleven and one-half units are prescribed. The other three and one-half units may be selected from those mentioned in the list designated below as Allowed. Only the number of units mentioned in connection with each subject will be accepted. In general, applicants will not be admitted with conditions in more than two units.

All entrance conditions must be removed by the beginning of the second year of residence.

See §§ 19-32 for an outline of the preparation required in the various subjects.

PRESCRIBED

English	3	units
Grammar.		
Composition.		
Classics.		
History and English Literature.		
Mathematics	3½	"
Algebra, through quadratics.		
Geometry.		
Plane.		
Solid.		
Spherical.		
Trigonometry.		
Plane.		
Physics	1	"
Chemistry	1	"
History	2	"
Latin. French. German. } One of these	2	"
	11½	"

ALLOWED

English, additional 1 unit.
History, additional 1 or 2 units.
Greek, 2 units.
Latin, 2, 3, or 4 units.
French, 2, 3, or 4 units.
German, 2, 3, or 4 units.
Physiography, ½, or 1 unit.
Botany, 1 unit.
Zoology, 1 unit.
Biology (½ year each of Botany and Zoology), 1 unit.
Drawing, ½ unit.
Manual Training, ½ unit.
Required total .... 15 units

Under English is included Grammar, Composition, reading of English Classics, and History of English Literature. The History of English Literature may form part of the work of either the third or fourth year. Four units in English should always be presented whenever it is possible to do so.

Biology is defined as one-half year of Botany and one-half year of Zoology, hence it cannot be accepted from an applicant who offers at the same time either, or both, of those subjects.

Full preparation in Plane Trigonometry and Chemistry should be presented. The Summer Session of the University of Michigan

affords facilities for doing this work between June twenty-fifth and August third, 1906.

The half unit allowed in Drawing and the half unit allowed in Manual Training must each cover at least 200 periods of work in an approved school.

The following is suggested as a desirable selection for the three and one-half units that are elective.

English, 1 unit.
History, 2 units.
Physiography, or
Drawing, ½ unit.

For a detailed description of these subjects see §§ 19-32.

EXAMINATIONS FOR ADMISSION

5. All examinations are held at the University. The principal examinations for admission to the Department of Engineering will be held on Wednesday, Thursday, Friday, and Saturday, September 19-22, 1906. Another opportunity is afforded on February 8-9, 1907; but entrance in September is strongly advised. Applicants will not be examined at any other time except on payment of a special fee of *five dollars.*

As the examination begins at 10 A. M. on Wednesday, it will be necessary for all applicants for admission on examination to present their credentials to the Associate Dean of the Department, at his office, Room 4, in the Old Engineering Building, on Monday or Tuesday, September 17 or 18, between the hours of 9 and 5, and receive from him papers admitting to the examination.

An applicant who fails in some part of the examination may, at the discretion of the Faculty, be admitted conditionally; but any condition so imposed must be removed at one of the two next regular examinations for admission, and no student who has an admission condition outstanding at the beginning of his second year of residence will be allowed to enter his class until such condition is removed.

The examinations in the several subjects will be in writing, and will be held in Tappan Hall in accordance with the schedule given below.

SCHEDULE OF EXAMINATIONS FOR ADMISSION IN 1906

	Sept. 19, Wed.	Sept. 20, Thu.	Sept. 21, Fri.	Sept. 22, Sat.	
History	2 P. M.				Room 8
Botany	10 A. M.				Room 8
Geometry		8 A. M.			Room 8
French		10 A. M.			Room 12
German		2 P. M.	2 P. M.		Room 12
Latin		2 P. M.	2 P. M.		Room 8
Chemistry		4 P. M.			Room 8
Algebra			8 A. M.		Room 8
English Composition and Literature				10 A. M.	Room 8
Physics				8 A. M.	Room 8
Phys. Geography				2 P. M.	Room 8
Astronomy				2 P. M.	Room 12
Trigonometry				4 P. M.	Room 8

SCHEDULE OF EXAMINATIONS FOR ADMISSION, FEB., 1907

	Friday, Feb. 8	Saturday, Feb. 9.	
Algebra	8 A. M.		Room 8
Geometry	8 A. M.		Room 8
Trigonometry	8 A. M.		Room 8
Physical Geography and Astronomy	11 A. M.		Room 8
German	2 P. M.		Room 8
Botany	3 P. M.		Room 8
History	4 P. M.		Room 8
Physics		8 A. M.	Room 8
English Composition and Literature		10 A. M.	Room 8
Latin		2 P. M.	Room 8
French		3 P. M.	Room 12
Chemistry		4 P. M.	Room 8

ADMISSION ON CREDITS FROM ANOTHER COLLEGE

6. Applicants who have taken some portion of the studies required for admission in an approved school or college—not a high school—may present credits for such work in place of taking examinations in the same. The following documents must be presented:

a. An official copy of their credits showing the subjects studied in such school or college, the number of weeks devoted to each, the number of class periods per week, and the standing attained upon completing the same.

b. An official certificate of their regular entrance to such school or college.

c. An official certificate of honorable dismissal, or voluntary withdrawal, from such school or college.

d. Also an official copy, or copies, of their credits from the school, or schools, where their previous studies were pursued, covering the same items, relating to such credits, enumerated in *a.*

Applicants should apply in person to the Associate Dean, Room 4, Old Engineering Building, September 17 or 18, or February 8 or 9, or their documents may be sent on in advance as much before these dates as practicable.

ADMISSION TO ADVANCED STANDING

7 *a.* Bachelors of Arts of this University, and graduates of other approved colleges, are admitted without examination to advanced standing as candidates for a degree in engineering.

They should present to the Associate Dean an official certificate of the date of their graduation—not their diploma—and an official copy of the record of the studies they have completed, showing the subjects studied, the number of weeks devoted to each, and the number of class periods per week.

Such students are excused from a considerable portion of the requirements.

See § 165. The remaining requirements can usually be completed in two years, if the student takes as electives, while an undergraduate,* the mathematics required of engineering students (see § 133) and Course 4 in drawing (see § 140). A knowledge of differential and integral calculus, of theoretical mechanics, of elementary drawing, and of descriptive geometry, is needful for the advanced work.

The culture imparted by classical or other liberal training will be found to have its uses for one engaged in engineering work, and previous discipline of the faculties in exact research will enable the professional student to master more easily the requirements of the course. All the time the student can devote to general studies before taking up specialties will be well spent.

b. Students who have completed at least one year of work in an approved college may be admitted to advanced standing without examination, except such as may be necessary to determine what credits they are to receive.

Such applicants should present a letter of honorable dismissal, or of voluntary withdrawal, from college; an official copy of their college record; and an official record of their high school, or other work, preparatory for college, the same as those admitted on diploma (see § 3).

c. Students who have not completed a year's college work in an approved college, but previously to entering this department of the University have pursued studies beyond those required for admission, may be admitted to advanced standing. Entrance requirements, in such cases, may be satisfied by complying with the conditions stated in either § 4, §5, or § 6.

---

*A student enrolled in the Department of Literature, Science, and the Arts, and desiring to elect any work in the Department of Engineering which is not printed in the Announcement of the former Department, must obtain written permission if his own Dean, have it approved by the Associate Dean of the Department of Engineering, and attach that paper to his election slip.

Credit for additional work will be given only upon examination.

Those entering at the beginning of the second semester, February 11, 1907, and expecting to join the first year's class, should be prepared in the mathematics of the first semester, mathematics 1, advanced algebra and analytic geometry (§ 133), in addition to the other requirements for admission.

Applicants should apply in person to the Associate Dean, Room 4, Old Engineering Building, September 17 or 18, or February 8 or 9, or their documents may be sent on in advance as much before these dates as practicable.

Manual training work and drawing pursued in a high school will be recognized for advanced credit, if considered by the instructors in the Department of Engineering equivalent to the work given in that Department. Students desiring advanced standing in drawing must bring all drawings completed previous to entrance.

Advanced credits must be secured and the record returned to the Associate Dean by the date named on the blank form issued by him for such record. An account once closed cannot be reopened without special permission. Application should be made to the Associate Dean.

ADMISSION AS GRADUATE STUDENTS

8. Graduates from this Department, or others who satisfy the Faculty that they possess equivalent attainments, may be received as students for further degrees in engineering upon the conditions mentioned in § 173.

Such persons should present to the Associate Dean an official certificate of the date of their graduation—not their diploma—and an official copy of the record of their college work, showing the subjects pursued, the number of weeks devoted to each, and the number of class exercises per week.

Applicants should apply in person to the Associate Dean, Room 4, Old Engineering Building, September 17 or 18, or February 8 or 9, or their documents may be sent on in advance as much before these dates as practicable.

ADMISSION AS SPECIAL STUDENTS

9. The term Special Student is applied to a person pursuing work in this Department who is not a candidate for a degree.

No one under twenty-one years of age will be admitted as a special student in this Department.

Practicing engineers, teachers, and other persons of mature years and recognized ability, may be given the courtesy of pursuing work as special students in this Department under the following conditions:—They shall be recommended by the heads of departments of instruction in which they wish to study, and be accepted by vote of the Faculty. They shall pay the usual fees of regular students.

The work of special students shall be under the direction of a committee of the Faculty.

A special student may become a candidate for a degree by vote of the Faculty, upon recommendation of the committee in charge of his work.

A student who is a candidate for a degree is not allowed to become a special student without permission of the Faculty previously obtained.

FEES AND EXPENSES

10. **Matriculation Fee.**—Every student before entering any department of the University is required to pay a matriculation fee. This fee, which for citizens of Michigan is ten dollars, and for those who come from any other State or country, twenty-five dollars,

is paid but once, and entitles the student to the privileges of permanent membership in the University.

11. **Annual Fee.**—In addition to the matriculation fee, every student has to pay an annual fee for incidental expenses. This fee is paid the first year of residence at the University, and every year of residence thereafter. Resident graduates are required to pay the same annual fee as undergraduates. The annual fee in the Department of Engineering is, for Michigan students, forty-five dollars; for all others, fifty-five dollars.

The Matriculation Fee and the Annual Fee must be paid *in advance*. No portion of the fees can be refunded, except by order of the Board of Regents, to students who leave the University, during the academic year. A by-law of the Board of Regents provides that no student or graduate shall be allowed to enjoy the privileges of the University until he has paid all fees that are due.

12. **Fee for Students Studying in Absentia.**—A fee of ten dollars is required of all graduates who are granted the privilege of pursuing studies for an advanced degree *in absentia.*

13. **Fee for Special Entrance Examination.**—An applicant for admission who desires to take the entrance examination at a time not announced is required to pay to the Treasurer a fee of five dollars before permission to take the examination can be granted him.

14. **Graduation Fee.**—The fee for graduation is ten dollars, and the by-laws of the Board of Regents prescribe that no person shall be recommended for a degree until he has paid all dues, including the Graduation Fee.

15. **Laboratory Fees.**—The required Laboratory courses cost approximately as follows:—*Shop Practice.*—In the mechanical and electrical engineering courses, *thirty dollars;* in the civil engineering course, *ten dollars. Physical Laboratory.*—A charge of *one dollar* is made

nically trained men fitted, by practice in English, to enter the cataloguing departments of manufacturing concerns, and the editorial rooms of technical publications. The course will furnish practice in review and editorial writing, descriptive cataloguing, and kindred work. It is open only to students who obtain special permission. Course 3 will vary somewhat from year to year. For 1906-1907 the work will be based upon material drawn from the writings of eminent scientists. Course 4 is the continuation of Course 3, and is open to students who have satisfactorily completed Course 3. Course 5, Technical Writing, is designed to supplement Course 1 by providing further instruction and practice in composition, with special reference to the needs of the practicing engineer. The work will consist mainly of training in the preparation and criticism of typical specifications and contracts; the fundamental legal principles involved will also receive attention. Course 6, Advanced Composition, offers to students who have credit for Course 1 opportunity for additional practice in writing. The work will consist of a study of standard prose and the writing of expository themes.

Course 1 is required and must precede other courses. Courses 2, 3, 4, 5, and 6 are elective. § 127.

NOTE.—Students in Course 1 who, during the first six weeks, show exceptional proficiency in English work will be excused altogether from the requirement of Course 1, and will be given work of higher grade.

41. **German, French, and Spansh.**—The aim of the instruction in German and French is to help the student to a reading and speaking knowledge of those languages. The elementary courses continue throughout one year, and their object is to familiarize the student with the forms and the constructions of the languages and to furnish him with abundant practice in reading and speaking them. As soon as practicable, English as a means of communication between instructor and student is banished from the class room, and the conversation conducted in the language taught. The vocabulary employed is, for the most part, that used in the ordinary intercourse of daily life.

The object of the courses of reading in scientific literature is to acquaint the student with the technical terms and special vocabularies of the various sciences, and thus enable him to consult books and periodicals bearing on his professional work with facility and profit. This reading covers a large range of scientific subjects, such as chemistry, physics (mechanics, sound, light, heat, electricity, and magnetism), geology, and mineralogy, as well as articles on steam and gas engines, hydraulics and hydraulic machinery, and mathematics. Many students read, besides the work assigned for the class room, scientific articles in the numerous German and French periodicals that are constantly coming to the University Library. The ability

Matriculation Fee	$10
Annual Fee	45
Shop-work fees, one course each semester	10
Drawing instruments	20
Books and stationery	25
Room and laundry, at $1.50 per week (might have been reduced by sharing room with another)	55
Board, 34 weeks, at $2.50	85
Clothes and incidentals	30
	$280

The matriculation fee is paid but once; the drawing instruments, if well selected, will be serviceable for a long time; railroad fares will vary, and are not included.

The annual expenses at the University, with ordinary economy, may be put at from $250 to $300.

To the above $25 in fees should be added for those from outside the State.

OUTLINE OF PREPARATORY STUDIES

19. The subjects on which applicants for admission to any of the courses leading to a degree in engineering will be examined are as follows:

20. **English Composition and Literature.**—The four units in English composition and literature should cover the following subjects:

Composition.—As preparation for this requirement, sustained and regular practice in writing is earnestly recommended. The student should prepare numerous written exercises throughout the four years of the high-school course, and a sufficient number of these exercises should be corrected by the teacher and revised by the student to secure the desired accuracy. The subjects upon which the student writes should not be drawn exclusively from literature; a considerable proportion of them should be so distributed as to give proper training in the various types of discourse, namely, description, narration, argument, and exposition.

Rhetoric.—The student should be grounded in the essentials of rhetoric, but those principles should receive emphasis which are most likely to be of service to him in his practice in writing, such as the principles of sentential structure, paragraphing, and the outlining of the essay. The correction of stock specimens of bad English is not recommended, and will form no part of the entrance requirement.

Grammar.—The applicant should be prepared to state intelligently the essential principles of grammar and to explain the syntactical structure of any sentence encountered in his reading.

Reading of Classics.—The following books are recommended for this part of the requirement:

1906-1911. For reading, ten books selected from the following list:

Group I (two to be selected):—Shakespeare's *As You Like It, Henry V, Julius Caesar, The Merchant of Venice, Twelfth Night.* Group II (one to be selected):—Bacon's *Essays;* Bunyan's *The Pilgrim's Progress, Part I;* The Sir Roger de Coverley Papers in *The Spectator;* Franklin's *Autobiography.* Group III (one to be selected):—Chaucer's *Prologue;* Spenser's *Faerie Queene,* (selections); Pope's *The Rape of the Lock;* Goldsmith's *The Deserted Village;* Palgrave's *Golden Treasury* (*First Series*) *Books II and III,* with especial attention to Dryden, Collins, Gray, Cowper and Burns. Group IV (two to be selected):—Goldsmith's *The Vicar of Wakefield;* Scott's *Ivanhoe;* Scott's *Quentin Durward;* Hawthorne's *The House of the Seven Gables;* Thackeray's *Henry Esmond;* Mrs. Gaskell's *Cranford;* Dickens' *A Tale of Two Cities;* George Eliot's *Silas Marner;* Blackmore's *Lorna Doone.* Group V (two to be selected):—Irving's *Sketch Book;* Lamb's *Essays of Elia;* De Quincey's *Joan of Arc* and *The English Mail Coach;* Carlyle's *Heroes and Hero Worship;* Emerson's *Essays* (Selected); Ruskin's *Sesame and Lillies.* Group VI (two to be selected):—Coleridge's *The Ancient Mariner;* Scott's *The Lady of the Lake;* Byron's *Maseppa* and *The Prisoner of Chillon;* Palgrave's *Golden Treasury* (*First Series*) *Book IV,* with especial attention to Wordsworth, Keats and Shelley; Macaulay's *Lays of Ancient Rome;* Poe's *Poems;* Lowell's *The Vision of Sir Launfal;* Arnold's *Sohrab and Rustum;* Longfellow's *The Courtship of Miles Standship;* Tennyson's *Gareth and Lynette, Launcelot and Elaine,* and *The Passing of Arthur;* Browning's *Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervè Riel, Pheidippides.*

For study and practice:—Shakespeare's *Macbeth;* Milton's *Lycidas, Comus, L'Allegro,* and *Il Penseroso;* Burke's *Speech on Conciliation with America,* or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration;* Macaulay's *Life of Johnson,* or Carlyle's *Essay on Burns.*

21. **English Literature.**—Preparation in this subject should include a systematic study of the outlines of English literary history. Due emphasis should be laid upon the division of the subject into periods; and the leading characteristics of each period should be studied and, as far as practicable, illustrated by the reading of rep-

resentative authors. Any of the current manuals of English literature may serve as the basis of this part of the work, which should occupy the third or fourth year of the course. The historical study should, however, be associated as closely as possible with the reading of classics.

Applicants for examination will be asked to write two essays of not less than two hundred words each, one upon a subject drawn from the books in the foregoing list, and the other upon a subject drawn from experience or observation. The language of these essays must be grammatical and clear. The spelling, punctuation, and capitalizing must be correct. The applicant must show ability to discriminate in the use of words and to construct well-organized sentences and paragraphs. A topical outline should accompany each essay. A few questions will be asked upon the leading facts in the history of English Literature.

22. **Mathematics*.**—The three and one-half units in mathematics include algebra, geometry, and trigonometry, as follows:—*Algebra.*—Fundamental Rules, Fractions, Simple Equations, Involution and Evolution, the Theory of Indices, and Quadratic Equations, as given in Beman and Smith's Elements of Algebra, or an equivalent in other authors.

Geometry.—Plane, Solid, and Spherical Geometry as given in Beman and Smith's Plane and Solid Geometry, or an equivalent in other authors.

Trigonometry.—Plane Trigonometry as given in Crockett's or Wenthworth's Trigonometry, or an equivalent in other authors.

N. B.—It is very desirable that High Schools whose graduates are received on diploma arrange their courses so as to include a portion of both Algebra and Geometry in their last preparatory year. Students who do not come from diploma schools should take a similar review if they expect to succeed in the study of mathematics in the University.

23. **German, French, or Latin.**—Two units. Applicants may offer French, German, or Latin, one of these three languages being required. It is expected that at least two years will be given to preparation in the language offered. The requirements in each are as follows:

German.—The applicant should be able to pronounce German correctly and to take part with reasonable correctness and facility in a simple conversation upon some topic drawn from the applicant's preparatory work. He should also be thoroughly familiar with the every-day facts of the grammar, and be able to put illustrative English phrases into German, and to translate at sight a passage of fairly easy prose.

---

*Students entering at the beginning of the second semester (February 11, 1907) should be prepared in the mathematics of the first semester in addition to the other requirements for admission.

French.—The whole subject of French Grammar. The applicant will be expected to read at sight easy French, and to translate correctly into French simple English sentences. The first year ought to be spent chiefly on the grammar and easy reading; and the second devoted to reading good modern French, accompanied by grammatical analysis and exercises in writing. The texts read should be chiefly narrative and conversational prose; modern, rather than classic, dramas should be read.

Latin.—Jones' First Latin Book, or an equivalent amount in any other introductory text-book, four books of Cæsar's Gallic War, and one of the orations of Cicero.

Advanced credit may be secured for one or two years of German, French, or Latin study in excess of the two years required for admission; and also if Latin and German or Latin and French are offered, advanced credit is given for the modern language, one year's study being deemed equivalent to Course 1, and a second year's study to Course 2. §§ 128-129.

24. **Physics.**—One unit. An amount represented by Carhart and Chute's High School Physics, to which one year should be devoted. Laboratory work in Physics is earnestly advised.

25. **Chemistry.**—One unit. The requirement is intended to cover one year's work. As a text-book, Freer's Elementary Chemistry, or an equivalent amount of work in Remsen's Introduction to the Study of Chemistry, is recommended. In either case the text

26. **History.**—One unit. In case the applicant has not had the work in United States History and Civil Government as given in the grades, the one unit of History required should cover the work in United States History and Civil Government as given in the High School.

The following is the order in which it is preferred history should be offered, either as one unit or as additional units up to three units:—

United States History and Civil Government.
Mediæval and Modern.
English.
Greek and Roman.
Ancient.

27. **Physiography.**—The applicant who offers one-half unit in physiography is expected to have studied one of the following books for a half year:—Dryer's Lessons in *Physical Geography;* Gilbert and Brigham's *Introduction to Physical Geography;* Davis's *Elementary Physical Geography;* or Tarr's *New Physical Geography.* In this connection field excursions are earnestly recommended and also the reading of such books as Geikie's *Earth Sculpture*, Shaler's

Outlines of the Earth's History and *Aspects of the Earth,* Russell's *Lakes of North America, Glaciers of North America, Volcanoes of North America,* and *Rivers of North America,* and Muir's *Mountains of California.* The ability to read a topographic map is essential in physiographic study; teachers will find the topographic maps issued by the United States Geological Survey an important aid.

The applicant who offers one unit in physiography is expected to have completed, in addition to the foregoing requirement, one half-year of laboratory work in meteorology. Davis's *Elementary Meteorology,* Waldo's *Elementary Meteorology,* and Ward's *Practical Exercises in Elementary Meteorology* will be helpful in connection with this work.

28. **Botany.**—The unit required of those who offer botany for admission is expected to include as much as a competent teacher, trained in laboratory methods, can accomplish with his classes in a year. No attempt is here made to indicate the exact extent of the ground to be covered, for the teacher should have large liberty in selecting material and topics as occasion requires; but it is recommended that one half-year be given to the form, structure, and habits of flowering plants, while the other half-year may be given to the natural groups of plants, physiology, and the adaptation of form and structure to environment.

The following text-books are recommended as offering numerous and helpful suggestions: Atkinson's *Elementary Botany;* Bailey's *Botany;* Barnes's *Plant Life;* Bergen's *Foundations of Botany;* Coulter's *Plant Relations and Plant Structures;* Spalding's *Introduction to Botany;* Stevens's *Introduction to Botany.* Ganong's *Teaching Botanist* is one of the most useful books for the teacher.

29. **Zoology.**—An applicant who offers a unit in zoology will be expected to have a knowledge of at least eight of the following animal types: 1 and 2. Two protozoa: Amœba, Paramœcium, Vorticella, Stentor, Volvox; 3. A Sponge: Spongilla or Grantia; 4. A hydroid: Hydra, to be compared with a medusoid form; 5. An echinoderm: Starfish or sea-urchin; 6. An annelid: the earthworm or the leach; 7. A crustacean: Crayfish, lobster, or crab; 8. An insect: butterfly (including immature stages), grasshopper, cricket, cockroach, or other insect; 9. A mollusk: the fresh water mussel or one of the snails; 10. A fish: minnow or perch; 11. An amphibian: frog, toad, tree-toad, salamander (Amblystoma), or mudpuppy (Necturus).

These forms must be studied by the laboratory method. Laboratory work should be directed not merely toward a study of animal structure, but as far as practicable toward the study of habits and reactions. It should furnish the basis for the class room discussion of principles; especially of evolution. Of the four periods per week that must be given to the work, two at least should be laboratory periods of two hours each, and the other two should be given to recitations or other class exercises. Careful original notes and drawings must be presented by applicants as part of the examination.

The mention of the following books may serve to indicate the character of the work required: Needham's *Elementary Lessons in Zoology;* Davenport's *Introduction to Zoology;* Jordan and Kellogg's *Animal Life;* French's *Animal Activities.*

30. **Biology.**—One half of the work above outlined in botany, together with one half of that outlined in zoology, will meet the requirements in biology.

31. **Drawing.**—One-half unit. Allowed. This work should cover:

(a) Exercises giving evidence of skill in the use of instruments and knowledge of materials used. These should consist mainly of the accurate geometrical construction of the more important plane curves, with simple problems involving tangents and normals to the same.

(b) Graded exercises in the orthographic projection of simple geometrical forms and working drawings of some of the more elementary constructions in wood and metal, all fully dimensioned, and in which the conventional signs are properly used.

(c) Exercises in line shading, shade lining, and cross-hatching, together with a reasonable skill in lettering.

32. **Manual Training in Shop Work.—One-half unit.** Allowed. If offered in wood work, it should cover a series of graded exercises in framing joints, dovetailing, and simple work in joinery, and cabinet making. This should be supplemented by a series of exercises in wood turning.

If offered in metal work, it should cover a series of graded exercises at the anvil and forge, including drawing down, upsetting, swaging, fullering, and welding. This may be supplemented with exercises in tool dressing and tempering, and in manipulating metals with the chisel and file.

FELLOWSHIP IN GAS ENGINEERING

33. The Michigan Gas Association continues for the year 1906-7 the support of the Fellowship in Gas Engineering which it has maintained since 1900-1. The annual stipend is five hundred dollars. By the terms of the gift the course of study is in charge of the heads of the departments of instruction in chemical engineering and mechanical engineering. The holder of the fellowship for the year 1905-6 was Joel Martin Barnes, B.S.

SCHOLARSHIPS

34. There are no scholarships, at present, in the Department of Engineering.

There are, however, annually appointed about twelve assistants at salaries ranging from $100 to $200. For the most part these assistants are graduate students, a few being appointed from the senior class.

STUDENT EMPLOYMENT

35. The University does not undertake to furnish manual labor to students; yet a considerable number find opportunities in the city to meet a portion of their expenses. The Faculty suggests to such students that they do not attempt to carry the full amount of work outlined. Much more efficient work can be accomplished by taking a longer time to cover the course. Each student doing outside work should notify the Classification Committee of such fact at the time of classification.

The Students' Christian Association and the University Y. M. C. A. do what they can to aid those who are seeking employment.

SUGGESTIONS AND DIRECTIONS

36. Plan to reach Ann Arbor from three to ten days before September 25, 1906, if entering the first semester, or before February 11, 1907, if entering the second semester, in order that such preliminaries as finding a rooming and boarding place may be settled before the opening of the regular session.

Students on arriving in Ann Arbor can obtain information in regard to rooms and board by calling at the office of the Secretary of the University. The Students'

Christian Association and the University Y. M. C. A. also actively interest themselves in assisting newcomers to find rooms and boarding places.

Applicants for admission on examination should present their credentials to the Associate Dean of the Department, at his office, Room 4, in the Old Engineering Building, on Monday or Tuesday, September 17 or 18, between the hours of 9 and 5, and receive from him papers admitting to the examination. The result of the examination may be learned at the Associate Dean's office Monday, September 24.

Applicants for admission on diploma (§ 3) should present their recommendation blanks to the Associate Dean not later than September 24, 1906.

When admitted, each student will be furnished with a blank containing directions for subsequent procedure.

RELATION OF STUDENTS TO THE CIVIL AUTHORITIES

37. Students are temporarily residents of the city, and, like all other residents, are amenable to the laws. If guilty of disorder or crime, they are liable to arrest, fine, and imprisonment. A rule of the University Senate provides that, if a student is arrested, or is convicted by the civil authorities, he shall be cited to appear before the Faculty of the department in which he is matriculated, and shall be liable to suspension or expulsion.

WITHDRAWAL FROM THE DEPARTMENT

38. Before withdrawing from class work, even temporarily, students should report to the Associate Dean.

Honorable Dismissal will be granted by the Associate Dean to students whose records are clear.

A statement of Voluntary Withdrawal will be granted by the Associate Dean to students whose records are not clear, and who are not subject to special discipline.

Those desiring to transfer to another department of the University should apply to the Associate Dean.

THE WORK OF THE DEPARTMENT

39. The studies pursued in the earlier part of the course are practically the same for all engineering students. They comprise, in *Mathematics,* advanced algebra, analytic geometry, and the elements of the differential and integral calculus; in *German, French,* and *Spanish,* the grammar, and reading of narrative prose and current scientific literature; in *English,* courses in composition and rhetoric; in *Physics,* mechanics, sound, light, heat, electricity, and magnetism; in *Chemistry,* the principles of inorganic chemistry; in *Drawing,* descriptive geometry; in *Shop Practice,* carpentry, pattern making, and forging.

For the order of studies, see § 149.

The more technical subjects follow in the latter part of the course. Some of these are of equal value to all engineering students, such as theoretical and applied mechanics, the strength and resistance of materials, and the metallurgy of engineering metals. Other subjects are adapted to the special requirements of the several courses.

For the order of studies, see §§ 150-163.

The general scope of the courses offered is shown in the following:

40. **English.**—The courses in English are primarily composition courses designed to develop in the student correctness, fluency, and constructive power in the expression of his ideas. Course 1 is concerned with elementary principles and details of style. Course 2, Technical Journalism, is designed in response to a demand for tech-

nically trained men fitted, by practice in English, to enter the cataloguing departments of manufacturing concerns, and the editorial rooms of technical publications. The course will furnish practice in review and editorial writing, descriptive cataloguing, and kindred work. It is open only to students who obtain special permission. Course 3 will vary somewhat from year to year. For 1906-1907 the work will be based upon material drawn from the writings of eminent scientists. Course 4 is the continuation of Course 3, and is open to students who have satisfactorily completed Course 3. Course 5, Technical Writing, is designed to supplement Course 1 by providing further instruction and practice in composition, with special reference to the needs of the practicing engineer. The work will consist mainly of training in the preparation and criticism of typical specifications and contracts; the fundamental legal principles involved will also receive attention. Course 6, Advanced Composition, offers to students who have credit for Course 1 opportunity for additional practice in writing. The work will consist of a study of standard prose and the writing of expository themes.

Course 1 is required and must precede other courses. Courses 2, 3, 4, 5, and 6 are elective. § 127.

NOTE.—Students in Course 1 who, during the first six weeks, show exceptional proficiency in English work will be excused altogether from the requirement of Course 1, and will be given work of higher grade.

41. **German, French, and Spansh.**—The aim of the instruction in German and French is to help the student to a reading and speaking knowledge of those languages. The elementary courses continue throughout one year, and their object is to familiarize the student with the forms and the constructions of the languages and to furnish him with abundant practice in reading and speaking them. As soon as practicable, English as a means of communication between instructor and student is banished from the class room, and the conversation conducted in the language taught. The vocabulary employed is, for the most part, that used in the ordinary intercourse of daily life.

The object of the courses of reading in scientific literature is to acquaint the student with the technical terms and special vocabularies of the various sciences, and thus enable him to consult books and periodicals bearing on his professional work with facility and profit. This reading covers a large range of scientific subjects, such as chemistry, physics (mechanics, sound, light, heat, electricity, and magnetism), geology, and mineralogy, as well as articles on steam and gas engines, hydraulics and hydraulic machinery, and mathematics. Many students read, besides the work assigned for the class room, scientific articles in the numerous German and French periodicals that are constantly coming to the University Library. The ability to read German and French scientific periodicals is of great value to the student in the prosecution of much of his work. In some of the more important courses in the Engineering Department a reading knowledge at least of both German and French is required of the students taking them.

Elective courses are offered for the accommodation and benefit of students who have the time and inclination to carry their language work beyond the limits of the required courses. Of the several electives offered, such courses are given as seem best suited to the needs of those applying for advanced work.

In addition to the extensive scientific vocabulary with which the student becomes acquainted, he is provided with practice in epistolary correspondence and is made familiar with the use of business and commercial forms.

The courses in Spanish are almost entirely conversational, and are offered chiefly to meet the demands of students looking forward to a professional career in countries where Spanish is the prevailing medium of communication, as in the Philippine Islands, the West Indies, Mexico, and the countries of Central and South America. The aim of the instruction in this department is to give the student acquaintance with and facility in the use of Spanish as it is spoken in the social and commercial world, the vocabulary chosen being that heard and used in ordinary daily life. These courses include as a part of their work considerable practice in business correspondence.

Opportunity for advanced work in Spanish is offered to students who desire to make themselves specially proficient in this language.

42. **Mathematics.**—The required work (including theoretical mechanics) is the same for all students of engineering, except those in chemical engineering, architecture, and architectural engineering, and extends through the first three years.

It is the object of this course not only to impart to the student the mathematical knowledge requisite for the study of the various branches of engineering, but to train his mind in the methods of precise reasoning and accustom him to the proper application of general principles to particular cases.

The first year is devoted to advanced algebra and to plane and solid analytical geometry. In the first semester of the second year the differential calculus and the beginning of the integral calculus are studied, special stress being laid on the geometrical applications, such as the discussion and tracing of curves. During the second semester of the second year and the first semester of the third year the further study and application of the calculus, including the elements of differential equations, are carried on in close connection with the study of theoretical mechanics, three hours a week being devoted to the latter subject and two hours to the calculus. The work in mechanics begins with kinematics, the simplest cases of motion in a straight line and in a curve being discussed and illustrated with numerous examples and problems, then follows a thorough course in statics where geometrical and analytical methods are used side by side. The third year is devoted to kinetics and the elements of differential equations. The student is introduced to the important ideas of work and energy and some of the more complicated problems regarding the action of forces are treated with special reference to their application in engineering.

In all these courses much time is devoted to the solution of problems in order to combine a fair knowledge of the elementary principles of higher mathematics with the necessary facility in applying these principles to concrete cases. The classes are divided into sections as small as practicable, so as to make it possible for the instructor to give his individual attention to the student. Models are used to assist the imagination both in geometry and in mechanics. § 133.

Students desiring to pursue their mathematical studies further will find a large list of electives among the courses in pure and applied mathematics offered in the Department of Literature, Science, and the Arts.

43. **Physics.**—The instruction in general physics covers a thorough course with the use of trigonometry and extends through an entire year. The first semester is devoted to mechanics, sound, and light; the second to heat, electricity, and magnetism. The subjects are amply illustrated with appropriate experiments accompanying the lectures. Two additional courses in the laboratory introduce the student to quantitative methods in the study of physics, and prepare him for the more difficult and exacting work in electrical measurements. §134.

44. **Chemistry.**—Two courses in chemistry are required of all engineering students. The first course in the principles of chemistry presupposes a year's preparatory training in chemistry and covers briefly by lectures, with demonstrations, and recitations the important facts regarding the metallic and non-metallic elements. Due regard is given to the theory of chemistry and the method of scientific reasoning. This is followed by a course in qualitative analysis in which a class and laboratory study is made of the properties and interaction of the more common inorganic compounds in water solution. Students in the course in chemical engineering are required to take a second course in qualitative analysis, two courses in quantitative analysis, and one course in organic chemistry besides the more technical work outlined under Metallurgy (§§ 45-136) and Chemical Engineering and Chemical Technology (§§ 84-135).

45. **Metallurgy.**—A course of instruction by lectures and recitations is given to all engineering students upon the subjects of fuel, refractory material, iron, and steel. The lectures are illus-

trated by charts and drawings of furnaces and appliances used, and by samples of furnace products. Advanced courses offer opportunity for a more detailed study of the effects of heat treatment and mechanical work upon the properties of iron and steel both in the class room and laboratory. The metallurgy of gold, silver and copper is taught largely by laboratory courses. The equipment of the laboratory is described on page —.

46. **Astronomy.**—Practice in the determination of time, latitude, and azimuth is offered to students in engineering. The ordinary problems necessary in field work are taken up by each student, who makes for himself a complete series of observations and reduces his own data. Observations are thus made with the sextant for time and latitude, using the stars and the sun; with the surveyor's transit for time, latitude, and azimuth; and with the meridian transit for time and latitude by Talcott's method. A thorough drill is given in the use of astronomical ephemerides and in the making of computations.

Other elective courses offer further instruction in Practical Astronomy, and in the Theory of Least Squares. This last should be taken by all students interested in experimental work. § 137.

47. **Mineralogy and Geology.**—The civil engineering students are required to take a brief course in mineralogy, which aims to make them acquainted with the physical and chemical properties, occurrence, and uses of the more common minerals, § 138, and a course in the elements of geology. § 139.

Advanced courses in both of these fields are open as electives.

48. **Drawing.**—A very complete course in mechanical drawing is given, embracing plane projection drawing, isometric drawing, descriptive geometry, and the elementary principles of lettering, coloring, and shading, with original problems executed in the drawing-room. Examples from numerical data are always given when suited to the conditions of the problem in hand. Students in mechanical engineering are required to sketch pieces of machinery, and afterward to make working drawings suitable for use in the shop. The plans of surveys, plane-table work, maps, designs in engineering construction, and the thesis drawings naturally come under this head. Instruction is also given in free-hand drawing, topographical drawing, ornamentation and lettering, shades and shadows, linear perspective, and drawing for stone cutting. The work in drawing occupies the student a part of almost every day throughout the course. § 140.

There are large and well-lighted drawing-rooms in the engineering buildings and in the engineering laboratory. There are also special rooms for blue-printing and a dark room for photography.

49. **Mechanical Practice and Shop Work.**—The aim of the instruction in this department is to make the student, as far as time will permit, acquainted with the best mechanical practice; the instructors in all practical work are men of wide experience, selected for their mechanical skill; and the department attempts to keep in touch with the most improved methods of mechanical construction. All courses are under the direction of the Superintendent of Shops, and instruction is given in the various branches by practical men, skilled in the craft which they teach.

The courses of instruction all begin with a systematic series of graded exercises, to give the student familiarity with the common tools used in the particular branch of work he is pursuing; and in connection with each course, the theory of the process is taught by text and recitations. The student thus becomes fitted to execute an ordinary piece of mechanical work and at the same time acquires familiarity with sources of information bearing upon such work. At a later stage in the course the student is taught to apply the principles previously studied in the classroom, and to combine skill and knowledge in the transformation of crude materials into articles which have a market value. § 141.

In *Wood Work and Pattern Making,* after the student has completed the preliminary series of graded exercises, he is set to making and assembling the parts of some complete piece of carpenter or joiner work, and he then devotes the remainder of the time, about three-fifths of the whole, to pattern work. Special stress is laid upon this part of the course. The student shapes, forms, and builds up patterns for castings in iron and brass, allows for shrinkage, makes core boxes, and becomes as familiar as possible, in the time allowed, with all the details of practice. Each class, with the help of the instructors, is expected to make a full set of the patterns needed for the construction of some special piece of working machinery. The first course in wood work is taken by all the engineering students.

In the *Foundry* the student learns to mould in green sand, in dry sand, and in loam, both for brass and for iron castings. Instruction is given in the making of cores for various purposes, and their use in the moulds; and in the art of selecting and mixing metals so as to produce the kind of material desired, careful attention being paid to the making of composition metals for specific purposes. Each student is required to take part in all of the work about the cupola and the brass furnaces, and to assume his share of their management during the periods of melting and casting.

In the *Forge Shop* the student is required to make forgings from a variety of irons and steels. In this way he becomes familiar with different kinds and qualities of materials suited for blacksmith work; he learns how to heat, forge, anneal, harden, and temper such tools as are used in machine shops; and he also has practice in soldering and brazing. Instruction is also given here in chipping and filing, and elementary machine tool practice. The student dresses and tempers his own tools for this latter part of the work. The object of the course is to enable the student to acquire a certain degree of skill in practice, and at the same time impart to him a knowledge of the principles governing such processes of forging as an engineer is likely to be called upon to direct. This work is required of all regular students.

In the *Machine Shop* the instruction is conducted on the same plan as in the pattern shop. On the completion of the series of graded exercises, the student begins the construction of parts of machines. Each class undertakes the building of one or more simple machines, or pieces of apparatus; and the work is planned in such a way as to give opportunity for learning general shop manipulation. Advanced students are also allowed to elect extra work and to assist the skilled workmen in the construction of larger machines.

A description of the engineering shops is given in § 101.

50. **Manual Training.**—In all the above-described courses advanced work can be taken by students who wish to become specially skilled in certain lines, or who desire to fit themselves for instructors in Manual Training Schools or in shops of that character.

51. **Surveying.** (*a*) *For Students in Civil Engineering.*—The course covers a full academic year, and includes text-book work, lectures, recitations, and field practice. The methods of surveying and computing used in laying out work are explained in detail; each student is required to make plats, maps, and the necessary calculations from actual surveys; and instruction is given in the proper care, use, and adjustments of instruments. There is an ample and varied supply of instruments for the use of students.

The classroom instruction embraces the following topics:—instruments and their adjustments; surveys for the inclosure and division of land; some account of the United States Land Survey; city surveys and town plats; surveys of lines of communication, such as roads, railways, and canals; hydrography; special surveys for various purposes of construction, such as laying out buildings, culverts, and abutments, and locating bridge piers; and, in general, the elements of all the ordinary operations to be expected in the professional practice of a civil engineer, but without including Land Surveying in the broad sense of the term. The principal text-books used are Johnson's Surveying, Raymond's Surveying, and Searle's Field Engineering. The more important works of reference are also easily accessible to the student. § 142.

The practical work outlined below, and carried on in the fall, early winter, and spring of each year, is intended to cover the elementary operations required in making surveys for engineering works, such as roads, streets, railways, canals, inclosures of land, public improvements, and the laying out of structures on the ground. The steel tape practice includes linear measurements, ranging lines, measuring and laying-out angles, laying-out circular curves, and making the records and computations pertaining to such work. With the transit and steel tape the student has practice in reading angles; traverse surveying; laying out circular curves, simple and compound; and running straight lines. He is also required to keep the records and make the calculations connected with such work; to make plats, and to compute areas. The practical work with the level and rod includes simple leveling, check levels, and profile leveling, together with the necessary field notes and checks. The practice in topography embraces the use of the transit and stadia; plane-table work; and surveying with aid of the camera, including the development of negatives and the printing and mounting of photographs. From the field notes and photographs maps are made by the student. In this connection, also, the student has practice in making blue prints from negatives and from drawings.

During the first six weeks of the following summer vacation (between the third and fourth year) the class goes into camp in a favorable locality as a field party. A survey is made for some line of communication, usually a railroad, including exploration, preliminary and located lines, easements to curves, profile leveling, check levels, profile making, cross section data, cross-sectioning, transfer of line to plugs near grade points, witnessing, and, in general, the preparation of the line for construction up to the point of beginning excavation. In this connection good field and office records are required; profiles and maps are made; and the necessary computations, including those for earthwork quantities, are worked out.

In addition to the railroad surveying, some other piece of field work is undertaken, the selection being made according to the fitness of the locality, the number and the previous experience of the members of the class, the time, and the weather, the purpose being to fix, by practical application, the principles learned from text-book, lectures, or previous experience. Within the past few years, work of the character indicated below has all been done, though not all in any one year:—small triangulation surveys, in which there is considerable reading of angles; compass surveys; shore-line surveys; surveys for special purposes, like town sites, bridge sites, cemeteries, or particular areas of unusual shape; resurveys of the United States Land Survey, including the finding and restoring of lost corners, and the subdivision of sections; contouring; hydrography; gauging of streams; leveling for special purposes, such as mill powers, lake levels, and the determination of the fall of streams; and, in general, any ordinary piece of field work, for which the locality chosen for the camp may afford favorable conditions.

The work in camp also includes office work along the various lines of field work, such as the computation of triangulations; reduction of careful measurements; calculation of earthwork, azimuth, areas, and elevations; mapping; platting; and profile-making. §§ 142-159.

(*b*) *For Students in Mechanical and Chemical Engineering.*—The student in mechanical or in chemical engineering takes a short course in the use of instruments, which is nearly all practice. He is required to read angles with a transit; to make a traverse; to make steel-tape measurements; to do simple leveling; and to compute and plat an inclosure survey. The aim of the course is to cover the simple manipulations in the ordinary use of surveying instruments, and to qualify the student for such duties in this line as are apt to fall to the mechanical engineer, such as mapping an inclosure, staking out a building and fixing the levels for it, laying out foundations for machines or boilers and establishing the levels for them, lining up shafts, setting water power machinery, and preparing lines for transmission of power by wire-rope, compressed air, or water. § 142.

(*c*) *Other Courses.*—Courses in Land Surveying, the United States Land Survey, the Canadian Survey, and in other specialties are provided, if properly qualified persons present themselves in sufficient number to form classes.

52. **Geodesy.**—For students prepared to undertake the work a course is offered, comprising lectures, reference reading, and written class reports, on geodetic methods in the field with special reference to successful present-day practice. Some consideration is given to notable historical surveys, and constant use is made of reports and standard works of reference. § 142.

53. **Applied Mechanics.**—A course of daily recitations during one semester is devoted to the graphical analysis of the stresses in roofs and bridges, to the designing of beams, columns, ties, and shafts and to the subject of stress and strain in structural members. Particular attention is paid to the principles underlying sound structural practice and the student is required to apply these principles to the solution of numerous engineering problems. Greene's "Graphics" and Greene's "Structural Mechanics" are used as textbooks. § 143.

54. **Structural Design.**—The subject of stresses in framed structures is treated in a course of lectures and recitations during the first semester of the senior year. Accompanying the class-room work is a course in the drafting-room in which the designs of roofs and bridges are made in conformity with modern structural practice and under the direction of instructors experienced in structural work. § 143.

55. **Masonry Construction.**—A course in the fourth year covers: composition, properties and occurrence of building stones; properties and methods of manufacture of brick, lime, cement, con-

crete; masonry structures, theory of design and methods of construction; foundations, tunnels; and the theory of reinforced concrete. Baker's "Masonry Construction" is used as text in part, supplemented by lectures, problems, and designs made by the student. The course extends through one half year. § 143.

56. **Testing Materials.**—The course in testing materials includes the use of laboratory and testing machine for commercial and investigative tests of cement, concrete, wood, steel, and other structural materials. Special stress is laid on the importance of careful study and full written discussion of results of all tests, and much time is spent in studying the published results of other investigators. Tests made for private individuals, especially in reinforced concrete. afford excellent opportunities for research along these lines. § 143.

57. **Hydraulics.**—A course is given occupying one-half year, and treating of the laws of the flow of water and other fluids through orifices and nozzles, in pipes and in open channels, and over weirs; the gauging of streams; and the theory and performance of turbine and tangential water wheels. § 143.

58. **Municipal Engineering.**—A course of lectures, recitations. and reading covering the subjects of Highway construction and Maintenance, laying out of Cities, Drainage and Sewerage, and Disposal of City Wastes is given in the Fourth Year. § 143.

59. **Water Supply Engineering.**—A course of lectures, recitations, and reading covering the development of water resources for power purposes and for municipal supply; run-off, rain-fall, and storage; construction of dams, distribution systems, and pumping stations; quantity of water required; and the financial management and the valuation of water works plants, is given in the Fourth Year. § 143.

60. **Experimental Hydraulics.**—Opportunity for original investigations upon the measurement of water, the power of motors, the resitances to flow in pipes and channels, and through pumps and motors, is afforded in the Hydraulic Laboratory. § 143.

61. **Mechanism.**—This course covers the general principles of mechanism relating to the composition and resolution of velocities, motions of rigidly connected points, and instantaneous axes, pairs of elements, bearings and screws, worm and wheel; rolling cylinders and cones, non-cylindrical rolling surfaces, and lobed wheels: connection by belts, cords and chains: levers, screws and cams: linkwork: parallel and straight line motions; continuous, intermittent and aggregate motions: wheels in train; gearing and gear teeth.

Both the analytical and graphical methods of solving mechanical movements are used.

Five periods a week for one-half year are devoted to the subject, the instruction being by lecture, recitation and drawing exercises. In the latter, the student is required to verify by construction principles taught and to solve a variety of assigned problems. § 144.

62. **Machine Details.**—Supplementing the work in Mechanism the student devotes three periods a week for one-half year to a study of machine details. The object of this course is to acquire a knowledge of the practical application of mechanisms in machines and to train the mind to grasp mechanical conceptions. Typical parts of machines, and those which can be bought from stock, are distinguished from those which must be specially designed and constructed. At the same time the student is instructed in elementary and practical machine drawing and the application of descriptive geometry to this work.

In the first part of the work the student makes correctly dimensioned free-hand sketches of parts of existing machines, showing details in such a way that a workman could readily make the part represented from the sketch. In the second part the student makes working drawings from the sketches previously made, paying particular attention to the technique of mechanical drawing. In the third part he learns to make detailed drawings from general designs, or assembled drawings.

He thus learns to take a machine apart mentally by seeing only a drawing of it, and to draw the parts thus separated correctly. This training prepares him for the courses in machine design which follow. § 144.

63. **Theory of Machine Design.**—Daily recitations for one-half year are given to the elements of machine design in which are applied the principles of Strength and Resistance of Materials to machines. The work embraces the materials used in machine construction and their use for fastenings which include riveted joints, bolts, nuts, keys and cotters; journals and bearings; axles and shafts; pulleys and gear wheels; belt, rope and chain drives; and the frame and supports of machines. The second part of the course relates to boilers and engines and includes a study of engine valve gears, automatic governors, link motions and reversing gears, the dynamic effect of reciprocating parts, balancing, and fly-wheels. Valve gears and the dynamic effect of reciprocating parts are studied mainly by the graphic method. § 144.

64. **Machine Design.**—The work in machine design is arranged along two different lines:—First, those courses are taken which relate especially to the design of machine tools in which experience and judgment are large factors; second, those in which the problems lend themselves more readily to the application of the principles expounded in the theory of machine design as treated in the textbooks.

The first courses are taken by third year students following the courses in Mechanism and in Machine Details, and are conducted in connection with shop practice where the student is enabled to verify the instruction by observing actual machine construction. These courses are intended especially to train the student in principles and facts necessary in the proportioning of parts to secure accuracy, smooth working, good wearing qualities and combining low cost of manufacture with high mechanical perfection. The student is also instructed in making detail working drawing and in the methods of commercial drafting room practice. The work in these courses is confined to machinery for working materials. Advanced courses are offered as electives for those who desire to specialize along this first line.

The second courses are taken by fourth year students following, or in conjunction with, the course in Theory of Machine Design, and embrace problems selected to illustrate to the best advantage the application of the principles discussed in the theory. These problems are usually selected from hoisting machines, machinery for transmitting power, boilers, steam and gas engines, and compressed air machinery. The student is furnished with the usual data given the draftsman and is then expected to make the necessary calculations, paying particular attention to the proportioning of the different parts for strength and simplicity. Each student is required to present complete designs for the problem assigned him, accompanied by bills of material and estimates. Advanced courses are offered as electives for those who desire to specialize along this second line.

The courses in machine design and their closely allied courses occupy the student continuously throughout the third and fourth years. § 144.

65. **Steam and Other Heat Engines.**—Four recitations a week for one-half year, with occasional lectures, are given to the study of the general principles involved in the action of the various forms of heat engines. This elementary course is required of all engineering students and relates especially to steam, gas, and hot-air engines. With the steam engine is included the boiler, furnace and chimney, and particular attention is given to the chemistry of fuel combustion.

In addition to the working of the fluid in the engine, attention is given to the different types of engines, boilers and gas engines, and their constructive features. The general problem of a modern power plant is also considered in this course for the benefit of those who are not required to give further time to the subject. § 144.

66. **Experimental Work in the Mechanical Laboratory.**—Two laboratory courses are offered, the first embracing the methods of calibrating and adjusting instruments, the measurement of power, and the testing of boilers, steam engines, and gas engines by the ordinary commercial methods. In the second course the heat

analysis and the action of the working fluid in these engines is experimentally investigated. Tests are made to determine the efficiency under various conditions of operation of furnaces, boilers, steam engines, gas engines and gasoline engines, both of the stationary and automobile type, gas producers and producer gas engines. § 144.

67. **Thermodynamics.**—This course embraces the study of the general principles governing the action of heat engines, steam, hot air, and gas engines, air compressors, compressed air engines, refrigerating apparatus, and steam turbines. The elementary course is followed by a more advanced course which takes up the study of the entropy temperature diagram and the theory of steam turbine design. § 144.

68. **Gas Engines and Gas Producers.**—A course of lectures and recitations is given covering the application of thermodynamics to the gas engine. A study is also made of the different types of gas engines and gas producers, with illustrated lectures showing the modern forms of these machines. § 144.

69. **Compressed Air and Refrigeration.**—The theory is discussed under thermodynamics. Additional work is given covering the application of the theory, mechanical details of construction, and methods of operation. § 144.

70. **Steam Turbines.**—This course treats of the modern forms of steam turbines and the theory of their construction and design. It also takes up the development of the different types of commercial turbines now in use and their application in a modern power plant. § 144.

71. **Heating and Ventilation.**—A course of lectures and recitations covering the theory of heat as applied in heating, the design and construction of hot air, direct and indirect steam, hot water, and fan, systems of heating. Plans are made for different systems. The design and construction of central heating systems is considered and actual installations are inspected. § 144.

72. **Primary and Storage Batteries.**—Two courses are given combining theory and experimental work, and dealing with the calculation and measurement of electromotive forces, polarization, internal resistance, and efficiency of cells. Several types of storage cells are in constant use. The practical use of batteries in electrical engineering is considered in the courses in distribution of electricity, and telephony and telegraphy. See also the courses in electrical measurements. § 145.

73. **Electrical Measurements.**—This course extends through an entire year, and is devoted to practical work in the laboratory with the most modern apparatus. In addition to exact methods of

measuring resistances, electromotive forces, and currents, it includes the calibration of the measuring instruments employed, the determination of capacity in absolute measure, the measurement of inductances, and the determination of the hysteresis curves of iron and steel. § 145.

74. **Dynamo Electric Machinery.**—Long and short courses are given (a) for electrical and (b) for other engineering students.

(a) The long course covers one and one half years and consists of one semester's work with direct current generators and motors, one semester alternating current generators and transformers, and one semester alternating current motors. The work is about half in recitation or lectures and half in the laboratory. The ground is covered very thoroughly. Tests are made of different types of apparatus for regulation, efficiency, and other usual requirements in dynamo practice.

(b) The short course covers one semester only and is about three-quarters class room work and one-quarter laboratory work. Students not candidates in electrical engineering are allowed to take the longer course if they so elect. The shorter course covers the whole ground of dynamo electric machinery, but of necessity is not as thorough because of lack of time. § 145.

75. **Electric Railways.**—This course consists of recitations and lectures describing the various systems using both direct and alternating currents. § 145.

76. **Design of Electrical Machinery.**—Two courses in electrical design give the fundamental principles and illustrate them by numerical calculations of electromagnets, of direct current generators and motors, alternators, transformers, and induction motors. The lecture courses are supplemented by exercises in drawing in which each student makes working drawings to accompany his own design. Highly satisfactory transformers, two-phase and three-phase generators, and induction motors have been built by electrical engineering students in the engineering shops. § 145.

77. **Distribution of Electricity.**—This course deals with systems of electrical conductors for the distribution of current for lighting and power, and with the electrical engineering problems which are involved in the distribution of electricity. § 145.

78. **Telephony and Telegraphy.**—Three courses are offered, one of lectures and recitations and two of laboratory work. The laboratory consists of two ample rooms, and new apparatus is constantly being added to the equipment. The University authorities have recently arranged with the Michigan State Telephone Company to install a branch exchange at the University which will be open to the use of the department of electrical engineering. The com-

pany is to furnish a complete set of duplicate parts for the use of the department also, and the company's experts will give occasional lectures supplementary to the regular instruction of the department. § 145.

79. **Photometry of Electric Lamps.**—This course is divided about equally between lectures and laboratory work. The various electric lamps are studied. Several excellent photometers of different types are used in the laboratory. § 145.

80. **Storage Battery Installation.**—This course of lectures and laboratory work is devoted to the study of the engineering uses of storage cells of various types. § 145.

81. **Electric Generating Stations and Substations.**— In this course the design and equipment of electric power houses, using hydraulic and steam power are considered. § 145.

82. **Alternating Current Phenomena.**—In this course the more complex phenomena of alternating currents are studied. Use is made of the symbolic method of Dr. C. P. Steinmetz. The course consists of lectures and recitations. § 145.

83. **Applied Electrical Engineering.**— This course of lectures and recitations is principally concerned with the subjects of power plants, shop drive, and alternating current work. § 145.

84. **Chemical Engineering and Chemical Technology.**— Under this heading are grouped the courses which treat of those manufacturing industries in which chemical processes play a vital part. The first course treats descriptively of industries which involve inorganic chemistry. Water and its purification for manufacturing purposes is treated first. It is followed by the subject of fuel and its utilization. The great acid and fertilizer industries, and the manufacture of soda ash with its numerous by-products come next. This leads to the electrolytic production of alkali and bleaching powder, and to the electrochemical industries. This topic is followed by a study of the manufacture of clay products, glass, mortars and hydraulic cements. In the second course the industries involving organic chemistry are treated in a similar way. The subjects comprise the manufacture of illuminating gas with recovery of by-products; the fat and oil industry, including the refining of the natural oils and their manufacture into soap, paint and varnish with their allied industries; the manufacture of sugar from beet and cane; the manufacture of starch and its conversion into glucose; the brewing and distilling industries; the manufacture of paper and the bleaching and dyeing of textile fabrics. Subsequent courses allow a more detailed study in the laboratory of a single one of these industries and give opportunity for specialization along any chosen line such as gas engineering, electrochemistry, cement and clay

products, or iron and steel. The equipment of the laboratory is described in § 100. The courses in metallurgy are given in § 136.

85. **Structural Arrangements of Ships.**—This course is devoted to the discussion of the practical details relating to the various parts of a ship's structure, such as keels, framing, plating, preparation of working drawings, ordering material, general methods of construction, and Classification Societies' rules. § 147.

86. **Ship Calculations.**—This course consists of a series of lectures and recitations upon the displacement and buoyancy of ships, and includes discussions of rules for determining areas, volumes, center of buoyancy, metacenters, change of trim, tonnage, freeboard, etc. The theory and use of the planimeter and integrator are also discussed. § 147.

87. **Strength of Ships.**—This course includes a general discussion upon the question of strength and resistance of materials, methods of obtaining curves of weights, buoyancy, shearing force, and bending moment upon ships under various conditions of wave support; general and local stresses, and strength of riveted joints. § 147.

88. **Stability of Ships.**—A series of lectures and recitations is devoted to the various methods of obtaining curves of stability, statical and dynamical, of vessels of different types under varying conditions. The geometrical properties of the surface of buoyancy, flotation, etc., are discussed, together with problems relating to the rolling of vessels in still water and in waves. Methods of reducing rolling are illustrated by models in the experimental tank. § 147.

89. **Resistance and Propulsion of Ships.**—Under this heading are treated all questions relating to the resistance of vessels to motion. Surface friction, wave making, eddy resistance, Froude's law of comparison, progressive trials, etc., are discussed and illustrated in the experimental tank. Investigations of the action of various forms of propellers, and the analysis of their effect upon the resistance of the vessel are also discussed. § 147.

90. **Ship and Engine Specifications.**—A series of lectures is given which embraces a general discussion of the preparation of specifications. Methods of estimating weights and costs; arrangements of pumping, heating, and ventilation; auxiliary machinery, etc., are also included. In connection with the design of a ship or machinery installation each student is required to prepare a general specification. § 147.

91. **Practical Shipbuilding.**—A course of lectures is given on arrangements of shipyards, methods and sequence of work, preparation of working plans, specifications, etc. Methods of estimating weights and costs, arrangements for pumping, heating, and ventilation are also discussed. § 147.

92. **Mould Loft Work.**—The course in this subject includes the laying off and fairing a set of lines of the full sized ships; method of obtaining bevels; expansion of various parts of the structure; laying off plating, and preparation of moulds. § 147.

93. **Marine Engineering.**—Under this heading are treated the theoretical and practical considerations governing the design and construction of marine engines and boilers of various types. Details of construction, weight, and space occupied, vibrations, and methods of balancing engines, are also treated, together with the design and arrangement of auxiliary machinery. § 147.

94. **Drawing and Design.**—The above courses are accompanied by work in the drawing room, which will include:—Laying off and fairing a set of lines from given offsets; calculations of displacement, center of buoyancy, etc., and plotting results; construction of capacity curves; calculation of change of trim and curves connected therewith; of launching; of strength and determination of curves of weight, buoyancy, shearing forces and bending moments; calculation of stresses; of courves of stability.

Later, the student will work out a design for a vessel to fulfil given conditions, as, for instance, a fast passenger or cargo steamer, cruiser, battleship, torpedo boat, or steam yacht, and will prepare the lines, general arrangement, midship section, and all calculations connected with the above, and if time permit, a complete set of working plans, together with an order form and specification.

In marine engine drawing the student will design a marine boiler with all details, and also a marine engine with as many of the detail plans as possible, and will make all necessary calculations. § 147.

95. **Experimental Tank Work.**—Students are given an opportunity of assisting in the moulding and preparation of the various models, and afterwards testing the same.

Experiments upon ships' forms are conducted in a systematic manner and the results of such experiments will give the student an intelligent idea as to the capabilities of any given form.

The action of bilge keels upon the rolling of vessels, and upon the speed are also subject to investigation. It is proposed in the near future to install special apparatus for the investigation of the action and properties of screw propellers.

For description of Experimental Tank see § 105.

Visits of Inspection.—See § 98.

96. **Architecture.**—The aim of the instruction in this department is to make the student an efficient draftsman and prepare him for the practice of architecture.

Two courses are offered, Architecture and Architectural Engineering, each requiring four years of study. These should be supplemented by office work during the vacation periods. In both courses provision is made for the study of the history, theory, and practice of architecture, for training in mathematics, science, construction, design, drawing, and in those languages in which so much of the literature of architecture has been written.

The course in Architecture aims to prepare the student for general architectural practice and leads to the degree of Bachelor of Science in Architecture. The course in Architectural Engineering is for those students who wish to specialize in the engineering and mechanical problems of modern building practice. Graduates of this course will receive the degree of Bachelor of Science in Architectural Engineering.

College graduates and experienced architectural draftsmen, who do not desire to take all of the required work leading to the above degrees, may pursue those studies for which their preparation is sufficient. § 148.

(*a*) *Elementary Design.*—An introductory course to the field of artistic design. Discussion of the principles of design and of the possibilities in design of line, color, and form. The influence of material on design. Exercises in design and the study of examples. § 148.

(*b*) *Elements of Architecture.*—The plan, wall, roof, arch, lintel; doors, windows, mouldings, the orders; arcades, vaults, domes. Lectures, drawing exercises and rendering in wash. § 148.

(*c*) *Architectural Design.*—A series of courses following Architecture 1 and 2. In succession, problems of increasing magnitude to be worked out in the drafting-room. Study of the requirements of various classes of buildings and of the artistic possibilities of building materials; training of the student in composition in plan, section, elevation and perspective, in accurate draftsmanship and effective presentation and rendering in line, black-and-white and color. § 148.

(*d*) *History of Architecture.*—The historical conditions, building materials and methods, planning and design, and the sculptured and painted decoration and ornament of the architectural styles will be studied by means of illustrated lectures, conferences, drawing exercises, and research. These courses should be taken in accordance with their numerical order. § 148.

(*e*) *The Allied Arts of Design.*—Landscape architecture, mural painting, decorative sculpture, furniture, metal-work, glass, ceramics, textiles. Lectures and research. § 148.

(*f*) *Architectural Composition.*—This course supplements the courses in architectural design by a series of illustrated lectures. § 148.

(*g*) *Architectural Seminar.*—Current architectural work and literature. Conferences, assigned reading, and reports. § 148.

(*h*) *Specifications.*—Discussion and writing of specifications for buildings. § 148.

(*i*) *Building Construction.*—Building materials and processes: working drawings. Wood, masonry and steel construction; fireproofing. Building stones, cements, terra cotta, woods, metals, and other building materials. Lectures, drawings, visits to buildings, and reports. § 148.

FACILITIES FOR INSTRUCTION

97. The collections for illustrating the instruction given comprise models, drawings, photographs, lithographs, and blue prints, representing trusses, arches, and details of construction in iron, wood, and stone; sections of valves, pumps, and injectors; indicators and gauges; working models in various lines and full-sized machines; working drawings of bridges, engines, dynamos, etc. These collections are receiving additions from year to year, by gift and purchase, and are invaluable to the students.

98. **Visits of Inspection.**—As often as practicable, visits are paid to neighboring manufacturing establishments, to electric light and electric power stations, and to points of engineering interest, for the purpose of acquiring a knowledge of the methods employed in building, in the construction of bridges, machinery, and ships, and the best practice in electrical manufacturing and engineering on a large scale.

Tests of engines and boilers, and of machinery in general, will be made on request, and the profit of such work devoted to extending the facilities of the engineering laboratory. The data of all experiments and tests made are kept in the laboratory records. Tests of materials are also conducted for private parties, and reported upon when desired.

All the laboratory work is on a practical basis, and is done as nearly as possible as it would be done in any well-arranged manufacturing establishment. There is a metallurgical laboratory connected with the chemical laboratory, supplied with assay furnaces and other appliances. The latest and best books on professional subjects are added yearly to the library, where they are accessible to all; and frequent references are made to them in the class room as the various subjects are brought forward.

99. **Physical Laboratory.**—The basement of the physical laboratory is devoted to the experimental work in heat, electricity, and magnetism. It contains about 8,000 square feet of floor space

and is divided into twelve rooms. These include a photometry room with blackened walls for testing the candle power of incandescent and arc electric lamps, and a storage battery room.

On the first floor are two lecture rooms, one seating 120 and the other 400 students. There are besides two apparatus rooms and three rooms for general laboratory purposes. The third floor contains another general laboratory, one class room, and several smaller rooms for the practical work in sound, light, and electro-chemistry.

The laboratory is supplied with the apparatus from the best American and European makers. It is especially well equipped with apparatus for electrical measurements. In sound, it includes tuning forks and resonators from Koenig, of Paris; in light, a spectrometer with 12-inch divided circle, an opthalmo-spectroscope from the Geneva Society, an optical bench, with accessories, from Duboscq, a Zeiss focometer, spectrómeter, and interferometer, and a polariscope from Schmidt and Haensch, and apparatus suitable for work in the ultra-violet and infra-red spectra.

In heat, mention may be made of standard thermometers, including a set from Haak reading to hundredths of a degree and covering the scale from—5°C. to 105°C., a platinum-rhodium couple, certified by the Reichsanstalt, and accessory apparatus from Siemens and Halske for the measurement of high temperatures, air thermometers, Clement and Desormes' apparatus for measuring the ratio of the two specific heats of a gas, and Regnault's vapor pressure apparatus.

The work in the laboratory is entirely quantitative in character, but provision has been made for illustrating the general principles and laws of physics in the lecture courses.

100. **Chemical Laboratory.**—The chemical laboratory occupies a centrally located building which has a floor space of over fifty thousand square feet. More than four hundred students pursue laboratory courses during each semester. About fifty courses are offered during the college year, most of which involve laboratory work. The building contains a reading room in which are shelved the most frequently required reference books and a few duplicate sets of chemical journals. The main portion of the chemical library is readily accessible in the adjacent library building, and is especially valuable to the research student because of its forty-nine complete sets of journals devoted wholly or in large degree to chemistry. Five ventilated dark rooms provide for spectroscopic, photometric, and photographic work and experiments in refraction. Sixty analytical balances are distributed in four balance rooms and in private laboratories, and others for heavier loads or of greater delicacy are reserved for special purposes. An especially accurate balance is placed in a constant temperature room.

In addition to a full supply of routine materials and apparatus for work in general, analytical, organic, physical, pharmaceutical and technological chemistry, facilities are offered for advanced study and research along many lines. For the preparation of raw materials, there are adequate grinding mills, both hand and power, for a wide variety of work. A continuous extraction apparatus holding twenty liters, a hydraulic press capable of exerting a pressure of five thousand pounds per square inch, a small filter press and a power-driven centrifugal machine are also provided.

The laboratories of Chemical Technology and Chemical Engineering occupy five rooms in the basement of the building and two on upper floors, besides those devoted to instructors' use. The assay laboratory contains both hand and power crushers and jar mills for fine grinding. The assay furnaces are either coke or oil-fired, and are connected with the pyrometer so that they are available for a considerable variety of work at high temperatures. The Le Chatelier electric pyrometer is permanently installed in its own room and is an exceptionally accurate and sensitive instrument.

For the study of Portland cement there is a small gas-fired rotary cement kiln which allows an accurate determination and adjustment of the burning temperatures, a Fairbanks-Morse testing machine for tensile tests, and a micrometer for determining changes of volume after setting. A high-grade polarizing microscope is used in the microscopic examinations of thin sections of the cement manufactured.

For the study of the structure of metals, polishing lathes and the necessary facilities for treating the polished section before its microscopic examination are abundantly provided. There are four vertical illuminating microscopes and an excellent photomicrographic outfit. The assay furnaces and electrically heated tube furnaces are available for heating specimens of metal and the pyrometer allows an extremely accurate observation of cooling curves and recalescence points.

The gas analysis laboratory provides apparatus for the analysis of the commercial forms of gases and calorimeters of the Mahler, Hempel, Parr and Junker type for the determination of the heating value of fuels. The adjacent photometer room is well equipped for the measurement of candle power of gas flames and of Welsbach mantles. The Ann Arbor Gas Company is very courteous in affording students facilities for tests at its works.

For the study of technical electrochemistry and electrometallurgy, direct current is available at various voltages from storage batteries, rotary transformers, and the 220 volt power plant. Measuring instruments and rheostats are at hand for control of current up to one hundred amperes. There are various forms of resistance, resistor and arc furnaces and an optical pyrometer for measuring temperatures above the range of the Le Chatelier thermocouple.

101. **Engineering Shops.**—The engineering shops are in a group of connected buildings, and occupy about 30,000 square feet of floor space.

The *Carpenter and Pattern Shop,* 40 by 127 feet, is equipped with the tools and machinery usually found in a first-class establishment.

One end of the shop contains work-benches and tools needed for hand work in carpentry. The other end contains benches and tools specially adapted for pattern-making. The central portion is occupied by a good variety of wood-working machinery. A lumber and pattern loft, 40 by 120 feet, contains blue-printing apparatus, materials, and a large collection of patterns made by students.

The *Foundry,* 30 by 120 feet, is equipped with cupola and brass furnaces, core-ovens, elevator, crane, blowers, and a supply of small tools and flasks suitable for the kinds of work done. From one to two tons of castings are made weekly.

The *Forge Shop,* 40 by 127 feet, contains twenty-eight down draft forges together with anvils and tools for doing a variety of work in hand forging; benches, vises and tools for chipping and filing metals; and machines for punching, shearing, drilling, turning and planing operations. Blast is supplied to the fires and gases removed by large power-driven fans, which thoroughly ventilate and purify the atmosphere of the room.

The *Machine Shop,* 40 by 127 feet, contains an assortment of engine lathes, speed-lathes, turret-lathes, planers, shapers, milling machines, grinding machines, and various tools for working in metal. A well equipped tool room is connected with this shop.

In connection with each of these four shops there is a recitation room, in which are collected models, drawings, charts, diagrams, and books, which are used in the courses of instruction.

The *Instrument Shop,* 20 by 32 feet, contains a number of small lathes and drills, and the tools needed in constructing scientific and other apparatus.

The *Drawing Room,* 32 by 54 feet, is fitted with improved drawing-tables, lockers, and drawing cases for use with classes in workshop drawing and machine design.

The central portion of the building, 32 by 54 feet, contains in the basement a well-ventilated lavatory and locker-room, and on the first floor an engine room with a 10 x 30 Reynolds-Corliss engine, a store-room, and the superintendent's office.

A good part of the equipment has been designed and built in the shops. New machinery is added from time to time by construction or purchase. The entire equipment is used in instructing engineering and other students in the use of tools for working in wood and in metals, and in modern workshop methods. Opportunity is afforded to become familiar with the more common materials and forms of construction used in engineering structures, buildings, and machinery. In all work an effort is made to follow the practice of the best shops.

102. **Mechanical Engineering Laboratory.**—This laboratory is devoted to experimental work in connection with the testing of engines, boilers, pumps, indicators, belting, gearing, lubricants, and strength of materials, and to such original work as can be undertaken with advantage. The work also extends to the testing of engines, boilers, and water-wheels of neighboring mills and electric plants. The Knowles and the Gordon pumping engines at the City Water Works have been fitted up by the company with special reference to the convenience of engineering students in making tests.

The steam laboratory is located in the new engineering building. It occupies a space 60 by 60 feet on the first and second floors of the north wing, with a sub-basement 42 by 17 feet and a mezzanine floor 23 by 36 feet. Adjoining the steam laboratory is a boiler room 34 by 34 feet, having a gallery eight feet wide, on the second floor, and a gallery 12 by 18 feet wide on the third floor.

On the first floor of the steam laboratory there is installed a 25 h. p. suction producer gas engine, by the Olds gasoline Engine Works; a 150 h. p. Armington & Sims engine; a 75 h. p. Westinghouse compound engine; a 30 h. p. De Laval steam turbine; a Worthington jet condenser; a Wheeler surface condenser with Edwards air pump and a 5-inch centrifugal circulating pump. The second floor of the steam laboratory contains a combined automatic and throttling engine of a high speed type; a Fairbanks and Morse gas engine; a Meitz-Weiss kerosene engine; an Otto gas engine; a Franklin air cooled automobile engine; an Olds automobile engine; a Blake air compressor; a Westinghouse air brake outfit; a large wet gas meter; and a small throttling engine.

The boiler room is provided with a high pressure Stirling boiler with a Buffalo Forge Co. direct steam driven, induced draft fan, a Cochrane feed water heater, econometer, and all necessary scales and tanks for boiler testing, and a 40 h. p. suction gas producer by the American Suction Gas Producer Co. On the third floor gallery of the boiler room is located a complete plant for the testing of direct steam radiators and pipe coverings. An experimental smoke-washing plant has recently been installed. On the mezzanine floor of the steam laboratory there is installed a complete equipment for testing boiler feed pumps and other small pumps. This plant consists of a large and a small pressure tank; a Wheeler surface condenser with a Blake air pump; two 50,000 pound scales with steel weighing tanks, each holding 600 cubic feet of water; and a number of boiler feed pumps.

In addition to the larger equipment enumerated above the steam laboratory is equipped with all the necessary accessory equipment which includes special apparatus for testing pressure and vacuum gauges; a special apparatus for testing indicators; apparatus for testing thermometers, both above and below the boiling point; electrical and mercury pyrometers; steam and gas indicators; thermometers; tachometers; standard weights; special plant for testing injectors; rotary and centrifugal pumps; water meters; water motors, including special Universal motor built for testing any form of bucket; and all necessary weighing tanks and scales.

On the second floor of the steam laboratory a small room has been provided for such chemical work as is ordinarily used in mechanical engineering. On the west side of the ground floor of the east wing a space 22 by 41 feet has been set apart for testing the physical properties of materials, and there is installed in this room a 100,000 pound Olsen and a 200,000 pound Richle Bros. testing machine. An adjoining room 22 by 24 feet is used as a cement testing laboratory, in which is installed an Olsen cement testing machine.

On the third floor of the north wing the 100-inch electrically driven ventilating fan for this wing has been installed especially for the investigation of fan heating problems. It is provided with a Reeves Transmission by means of which the speed can be varied from 100 to 400 revolutions per minute. The heaters are so arranged that any number of rows of heating pipes up to thirty-four can be had on either the suction or the blast side of the fan.

This fan is also provided with a discharge pipe leading into the mould loft by means of which experiments can be made to determine air pressures and resistances on bodies of different forms at velocities varying from 15 to 100 feet per second. This fan apparatus, while available for heating purposes, was designed with especial reference to experimental work. It was donated by the Buffalo Forge Co., Buffalo, N. Y., who have spared neither pains nor expense in its installation.

The two 140-inch electrically driven ventilating fans in the south and east wings, installed by the Buffalo Forge Co., are also adapted for experimental work.

103. **The Hydraulic Laboratory.**—This laboratory occupies a space of 40 by 60 feet on each of the first and second floors of the north wing adjoining the steam laboratories. A canal four feet wide, fourteen feet six inches deep, and forty feet long extends across the middle of the laboratory. Water enters this canal from the naval tank and is returned to the tank by a 15-inch centrifugal pump in a well at the far end of the canal. This pump is direct connected to a 150 h. p. cross compound engine. This canal is provided with bulkheads, screens and weirs, and is arranged for testing the flow of water over weirs and through nozzles up to a capacity of twenty cubic feet per second. The bulkhead between the naval tank and the canal is arranged for weirs and nozzles so that tests may be made for flow from a still water basin as well as in a running stream. The naval tank itself is arranged for bulkheads dividing it into three basins, each one hundred feet long. By means of a sluice in the bottom of the tank these basins can be connected to the hydraulic canal and the centrifugal pump, so that water can be pumped from one of the basins and delivered into either of the others. The lab-

oratory also has two weighing tanks for calibrating purposes, each holding six hundred cubic feet. A 36-inch pressure tank, designed for 250 pounds pressure, extends through two stories. This is supplied by a Duplex pump of one million gallons capacity, and affords means for nozzle and motor experiments under high heads. An open tank eight feet wide, thirty-two feet long and five feet deep rests on a platform near the ceiling of the second floor. The centrifugal pump supplies this tank, which serves as a forebay for water wheel tests under heads up to about twenty-five feet.

The 160 h. p. tangential water wheel exhibited by the Abner Doble Co. of San Francisco at the St. Louis Exposition has recently been installed. This beautiful machine is in part a donation.

104. Electrical Engineering Laboratory.—A new laboratory exclusively for electrical engineering, occupies the basement of the south wing of the new Engineering Building. The laboratory has a total area of about 5,000 square feet. It includes two large rooms for dynamo-electric machinery, one for direct-current apparatus, 54 by 29 feet, the other for alternating-current apparatus, 54 by 27 feet. There are also two rooms for telegraph and telephone engineering, one 35 by 19 and other 50 by 60, three rooms, each about 20 feet square, for research laboratories, and smaller rooms for storage battery, calibration of instruments, photometry, and photography, besides the office and private laboratory of the professor in charge.

In the dynamo rooms are two 10-light arc machines; two constant potential machines; a 33 K. W. composite wound alternator made for the University by the Fort Wayne Electrical Corporation; a 30 K. W. General Electric two-phase generator; a 7½ K. W. General Electric experimental alternator, which may be converted from generator to synchronous or induction motor by substituting different rotors; a matched pair of 30 K. W. shunt wound generators, connected both mechanically and electrically for testing by the Hopkinson and Kapp methods; and two rotary converters of 20 K. W. and 8 K. W. capacity respectively. These are all run by electric motors of from 2½ to 50 h. p. capacity. There is also a street railway motor of the D. C. type and an Arnold's A. C. railway motor. In addition, two small alternators of 60 and 125 cycles, respectively, are used for two-phase and three-phase experimental work. Arc lamps, banks of incandescent lamps, ammeters, voltmeters, wattmeters, galvanometers, electrodynomometers, resistances, rheostats, transformers, and a large storage battery are comprised in the equipment. The transformers include a set for conversion from two-phase to three-phase transmission, and the reverse, and two constant current transformers. A well equipped photometric room adjoins the dynamo room.

The laboratory for telegraphy and telephony is equipped with apparatus to illustrate commercial systems, including apparatus for duplex and quadruplex telegraphy, and various systems of telephone exchanges. During the year 1906-7 the Michigan State Telephone Company will build a branch exchange at the University which will be used by the department for instruction purposes. The company will also furnish a complete set of duplicate parts to the department.

The University lighting plant, consisting of one 200 K. W. and two 75 K. W. Thompson-Ryan generators, is available for instruction in the department. The 200 K. W. machine is direct-connected to a compound engine run at a speed of 180 revolutions a minute. The two 75 K. W. machines are connected by the Arnold system to two simple engines and run at a speed of 250 revolutions a minute. The system is 220-volt D. C. throughout, with both incandescent and arc lamps (two in a series) on the same circuits. All the feeders and mains are placed underground in the heating tunnels except those running from the Homœopathic Hospital to the University Hospital and to the Observatory. These buildings are supplied with current from the central plant on the campus by means of heavy cables and a "booster."

105. **Marine Engineering Laboratory.**—On the first floor of the New Engineering Building the east wing is devoted to the experimental tank. This tank is 300 feet long, 22 feet wide, with a depth of water of 10 feet. At the south end is a model room and work shop for the purpose of making models of vessels.

The models used in the tank for testing purposes are from ten to twelve feet long, and are made of paraffin wax. A clay mould is first made approximately to the shape desired, and a core inserted. The paraffin is then poured into the mould and after cooling, the rough model is taken to the model cutting machine. This machine consists essentially of two moving tables or platforms, upon one of which is placed the model and upon the other the drawing which it is desired to reproduce. The model moves under a pair of rotating cutters, which are made to follow the lines on the drawing. After cutting it is brought to its final shape by hand, then carefully weighed, and sufficient ballast added to bring it to any desired draft and displacement.

The tank is spanned by a traveling truck which is driven by a motor and can be run at any desired speed. Upon this truck are mounted the dynamometers for measuring the resistance of the models of various forms at different speeds.

106. **Mould Loft.**—The mould loft is situated on the top floor of the north wing of the Engineering Building, occupying a floor space of 3,600 square feet. The loft is fitted with the usual equipment, such as battens, bevel boards, benches for making moulds, etc.

Students are also allowed the use of the mould loft for the construction of small vessels. For this purpose steam boxes and bending slabs are provided. § 92.

107. **Astronomical Observatory.**—The observatory is known as the Detroit Observatory, having been founded through the liberality of citizens of Detroit. Valuable additions and improvements have been made by contributions from several sources. The building consists of a main part, with a movable dome, and two wings. The meridian circle in the east wing was constructed by Pistor & Martins, of Berlin. In the main part are mounted clocks by Tiede & Howard. The west wing contains the observatory library, which connects with the residence of the Director. The refracting telescope, mounted in the dome, has an object glass thirteen inches in diameter. It was constructed by the late Henry Fitz, of New York.

A small observatory near the main building is used in the work of instruction. It contains an equatorial telescope of six inches aperture, and a transit instrument of three inches aperture, with zenith telescope attachment. Extensive repairs and additions are being made to the Observatory at the present time.

108. **Mineralogical Laboratory.**—This laboratory occupies eight rooms in the basement of Tappan Hall and has a total area of nearly 6,000 square feet. One large room is used for general laboratory purposes, another is devoted to blowpipe methods and chemical crystallography, while a third room contains the mineralogical collections. There are also dark rooms for goniometric measurements. The general laboratory is well equipped with crystal models, natural crystals, and working collections for the rapid determination of minerals, principally by means of the physical properties. It is also equipped with goniometers and polarization microscopes. The blowpipe laboratory possesses ample facilities for the carrying out of blowpipe tests, both upon plaster tablets and charcoal, as well as all other chemical reactions useful in the determination of minerals. The mineralogical collections include the Lederer, Garringer, and Rominger collections.

109. **Geological Laboratory.**—Opportunity for practical work in geology is provided in rooms set apart for this use in the Museum building. The rooms are furnished with microscopes, photographic instruments, cutting and polishing lathes, and other apparatus for the preparation of specimens. Special encouragement and assistance are given to students wishing to carry on original investigations.

110. **The Libraries.**—The GENERAL LIBRARY contains about 150,000 volumes. Its reading room, seating about 300 persons, is open from eight in the morning till ten at night every day throughout the academic year, excepting Sundays and important legal holidays.

The ENGINEERING LIBRARY, comprising about 3,000 volumes, is now housed in the new engineering building, where the students of the Department of Engineering have direct access to the shelves. Over one-half of the collection consists of files of professional periodicals and proceedings of engineering societies. Funds being now

available extensive additions to the books and periodicals, particularly foreign periodicals, will be made during the coming year.

111. The Engineering Society.—Several organizations of students are maintained, aside from the usual literary societies, for the reading of papers and holding discussions in various scientific lines. The Engineering Society, composed of and officered by students of this department, holds meetings, at which papers of technical interest are read, and reports made upon observations and experiments. A reading room is maintained by the society, accessible to all students of the department. Many engineers of prominence have spoken before the Society in past years. A journal, called the Michigan Technic, containing papers read before the Society, abstracts of theses, contributed articles from alumni, and other matters of professional interest, is published by the students semi-annually.

112. American Institute of Electrical Engineers.—This Society has established a University of Michigan Branch to which students are eligible. Meetings of the Branch are held twice a month, when original papers, and advance copies of papers to be read at the regular meetings of the Institute, are read and discussed. In addition to the advance copies of Institute papers, each student joining the branch receives the Proceedings which are published monthly.

113. Physical Colloquium.—In the Department of Physics meetings are held every other week during the college year at which the instructors and assistants in the department come together to report on original research and discuss important articles in current physical literature. The meetings are intended primarily for graduate students but are also open to undergraduates doing advanced work.

114. **Chemical Colloquium.**—In the Department of Chemistry meetings are held every other week alternating with the meetings of the Physical Colloquium. These meetings are conducted by the several professors and instructors of the chemical department and reports are made upon investigations in the laboratory, together with critical discussions of recently published reviews of important researches. Graduate students and those advanced in chemistry are eligible to membership.

SUMMER SESSION

115. The Summer Session of the University of Michigan will open June 25, 1906. Work will be given in the Department of Literature, Science, and the Arts, Engineering, Medicine and Surgery, and Law. The session will close August 3, in all departments except in the

Department of Law, in which work will continue until August 17. A special Announcement can be had by addressing Mr. James H. Wade, Secretary of the University.

116. **Courses Offered.**—In the Department of Literature, Science, and the Arts, the Summer Session affords opportunity for study in languages, history, mathematics and the sciences. In the Department of Engineering, all of the courses in shop-practice are offered. and a part only of those in drawing, surveying, civil engineering, mechanical engineering, electrical engineering, and metallurgy. Students who wish to review studies, or make up deficiencies, preparatory to presenting themselves for admission to the Department of Engineering, will find courses directly adapted to meet their wants.

117. **Courses Required.**—Engineering students are required to take certain prescribed courses during the Summer Session between either their first and second, their second and third, or their third and fourth years. §§ 151-155.

118. **Tuition Fees.**—In the Department of Literature, Science, and the Arts, and of Engineering, the tuition fee is $15, regardless of the number of courses taken, except that no tuition fee is required of students of the Department of Engineering who are taking the work prescribed by the department for the Summer Session. §§ 151-155, 159-163.

Students entitled to exemption from payment of the Summer Session fee must procure a certificate from the Secretary of the Department of Engineering, to be presentd to the Chairman of the Executive Committee of the Summer Session at the time of registration, and to the instructors in order to gain admission to their classes.

119. **Other Laboratories.**—For a full account of all the laboratories, other than those described in this Announcement, which appertain to engineering, and their various resources, as also of the University collections for the study of art, archæology, ethnology, mineralogy, paleontology, systematic zoology, etc., consult the annual Calendar, which may be had gratis on application to Mr. James H. Wade, Secretary of the University.

120. **University Organizations.**—An attractive series of lectures and musical entertainments is provided each year at a low price by the Students' Lecture Association. The Choral Union is an organization of students and others for the study and practice of choral music. A course of concerts and a festival of three days in May are announced under its auspices each year.

The Oratorical Association fosters an interest in oratory, and its members have been remarkably successful in recent contests.

121. **Facilities for Physical Culture.**—The University is provided with excellent gymnasiums. The Waterman Gymnasium for men has cost about $65,000. The main floor, which is a rectangle with truncated corners and dimensions of 150 by 90 feet, is well equipped with the various kinds of apparatus usually found in the best modern gymnasiums. A number of smaller rooms are devoted to administration, fencing, boxing, and other special purposes, while the basement is given up to baths and lockers. The main hall is lighted in the daytime by means of a large skylight 60 feet above the floor, and in the evening by electricity. A gallery makes room for an elliptical running-track 375 feet in length.

In the conduct of the gymnasium the aim is not so much the development of a few gymnastic experts as the provision of wholesome physical exercise for the many. The facilities of the building, including physical examinations and instruction, are free to all students, the only charge being a rental of $2 a year for a locker. **Attendance twice a week is required of all first year students of this department.**

The Ferry Athletic Field of thirty acres has been set apart and equipped for open-air sports. Room is also provided for tennis courts. Much interest is manifested in foot-ball and base-ball by class and University teams.

The Ann Arbor Golf and Outing Club extends playing rights to a limited number of students. This is a private club, comprising in its membership both citizens and members of the University Faculties.

COURSES OF INSTRUCTION

122. The Courses of Instruction are subject to change from time to time; those proposed for the year 1906-7 and required for graduation, as stated in §§ 164-170, are described below, together with some advanced elective and technical courses, which are designated accordingly. The amount of credit towards graduation assigned to each course is indicated by the expression *one hour, two hours,* etc., an *hour of credit* being given for the satisfactory completion of work equivalent to one exercise a week during one semester. Lectures and recitations are usually one hour in length, but in laboratory work, drawing, and other practical exercises, a longer attendance is required in order to secure an hour of credit. An hour

of credit represents ordinarily about three hours of actual work, including preparation.

Courses given in the Department of Literature, Science, and the Arts are (with the exception of the courses in German and in French, for which special permission is required), all open as electives to engineering students who can spare the time and are qualified to pursue them with advantage.

No credit is given for work done outside of the University during the student's connection with the Department of Engineering, unless such work is substantially equivalent to some course offered in the Department and has been done under approved supervision.

Students will be classified and assigned to sections by a Committee of the Faculty. In many subjects the size of the class requires its division into several sections.

A student enrolled in the Department of Literature, Science, and the Arts, and desiring to elect any work in this Department, must obtain written permission from the Dean of the former Department, have it approved by the Dean of the Department of Engineering, and attach the paper to the election slip.

RULES GOVERNING ELECTION OF STUDIES

123. The work of students must be arranged in conformity with the following regulations:

a. Before entering on any study the student must give the instructor satisfactory evidence that he is prepared to pursue it with advantage.

b. No student will be allowed to elect merely a part of a course, without special permission of the Faculty.

c. No credit will be allowed to a student for work in any course, unless the election of the work is formally entered on his classification blank before the work is begun.

d. After the first Saturday of each semester no study can be taken up or dropped without special permission of the Faculty.

e. All requests to the Faculty must be made out on printed forms furnished by the Secretary of the Department.

f. The Faculty requires a student to drop a part of his work at any time, if in its opinion he is undertaking too much; or to take additional work, if it thinks he is not sufficiently employed.

g. The Faculty reserves the right to withdraw the offer of any elective study not chosen by at least six persons.

h. In case of exceptional proficiency, permission to take hours in addition to those named in the published schedule is granted by the Faculty on special request; but in all cases requests for permission to take an additional number of hours must be in the hands of the Secretary (See *e.*) on or before the first *Saturday* of the semester during which the additional work is desired. No permission to take extra hours will be granted to students in their first semester of residence.

i. After matriculation, a student cannot, without special permission of the Faculty, be admitted to examination in any one of the courses given, until he has received in the University the regular instruction in such course.

RULES RELATING TO EXAMINATIONS AND CONDITIONS

124. Examinations for admission are held before the beginning of each semester. (See page 23.)

An applicant who fails in some part of the admission examination may, at the discretion of the Faculty, be admitted conditionally; but any Condition so imposed must be removed at one of the next two regular examinations for admission, and no student who has an Admission Condition outstanding at the beginning of his second year of residence will be allowed to enter his classes until such Condition is removed.

Examinations, usually in writing, are held at the end of each semester (see Schedule, page 116), but classes are liable to be examined at any time, without notice, on any portion of their previous work.

To receive credit for a course, duly elected, a student must be reported as *Passed.* If he has the record of *Not Passed,* he cannot receive credit without electing the course anew and pursuing the course again in class. If he has the record of *Conditionally Passed,* he must, as provided below, complete the course at either of the first two supplementary examinations next following. If, after the second supplementary examination, he has not received credit, then he shall be recorded as *Not Passed* and shall not be entitled to receive credit without electing the course anew.

If he has the record of *Incomplete* or *Absent with Excuse,* he shall present himself for record at the next following supplementary examination. If he does not then present himself, he shall receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge. Any record of *Conditionally Passed* thus reported shall lapse into a *Not Passed* unless the course be satisfactorily passed at the *next* supplementary examination.

Students who are unavoidably absent from an examination should explain their absence as soon as possible, either personally or by letter, to the Associate Dean.

Students who are *Absent without Excuse* from examination will receive the record of *Conditionally Passed* or *Not Passed,* as determined by the instructor in charge of the course.

Supplementary examinations for those who have been reported *Conditionally Passed, Incomplete,* or *Absent with Excuse,* in regular work will be held three times a year:—viz., on the last Friday and Saturday of the Summer Vacation, on the first Friday and Saturday after the Christmas Vacation, and the first Friday and Saturday after the Spring Recess.

Students who wish to present themselves for examination in any subject must present to the instructor in charge, as early as Wednesday before the examination, a supplementary examination slip obtained from the Secretary.

Students having deficiencies in studies which can be taken during the Summer Session are advised to make up those deficiencies during the Summer Session and thus be enabled to devote their entire attention to the studies elected during the regular session.

The courses announced for the year 1906-7 are as follows:

125. GREEK

For students in Architecture and Architectural Engineering. Professor FAIRBANKS.

FIRST SEMESTER

8. History of Greek Art from the Beginning to the Roman Period. *Three hours.*

This course is open to all students who have completed the first year, irrespective of the study of Greek. Gardner's *Handbook of Greek Sculpture* and Tarbell's *History of Greek Art* will be made the basis of a more general study. Illustrated with stereopticon.

126. LATIN

For students in Architecture and Architectural Engineering. Professor KELSEY.

SECOND SEMESTER

[10. Roman Art. Elements of Roman Archæology; sculpture and painting in the Roman period. Illustrated lectures. *Three hours.* Omitted in 1906-1907.]

127. ENGLISH

Mr. BOHN, Mr. BREITENBACH, and Mr. MARCKWARDT.

Consultation hours to be arranged with the instructor.
For a description of the courses in English see § 40.

FIRST SEMESTER

1. Paragraph—and Theme—Writing. *Four hours.*
3. Scientific Literature. Readings, discussions, and essays. Among the authors to be studied are Spencer, Darwin, Huxley, Tyndal, Wallace, Faraday, and Clifford. *Two hours.*
5. Technical Writing. Specifications and Contracts. *Two hours.*
6. Advanced Composition. Essays in Exposition. *Two hours.*

SECOND SEMESTER

1. Paragraph—and Theme—Writing. *Four hours.*
2. Technical Journalism. *Two hours.*
4. Scientific Literature. Readings, discussions, and essays. *Two hours.*

Open to students who have satisfactorily completed Course 3.

128. ***GERMAN**

Assistant Professor WAIT, Mr. DUBEE, Mr. MENGER.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*
4. Reading of German Scientific Literature continued. *Four hours.*

In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.

5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.) This courses is a required course for those students who present 4 units of German for admission.
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

---

*REQUIRED COURSES IN MODERN LANGUAGES

In order to satisfy the requirements for graduation, a student must complete sixteen hours of modern language work in addition to that presented for entrance.

The specific courses will be determined in accordance with the following scheme, depending upon the student's previous preparation in language.

I. Students presenting 2, 3, or 4 units of Latin, but with neither German nor French for entrance, will take
  16 hours of German, or
  16 hours of French, or
  8 hours of French and 8 hours of Spanish.

II. Students presenting 2 units of German, either with or without Greek or Latin for entrance, will take
  8 hours of German, at once, and 8 hours of French, or
  8 hours of German, at once, and 8 hours of Spanish.

III. Students presenting 3, or 4 units of German, either with or without Greek or Latin for entrance, will take
  4 hours of German, at once, and 12 hours of French, or
  4 hours of German, at once, and 12 hours of Spanish.

IV. Students presenting 2 units of French, either with or without

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking German. *Four hours.*
2. Elementary Course continued. Grammar and Reading. *Four hours.*
3. Reading of German Scientific Literature. *Four hours.*
4. Reading of German Scientific Literature continued. *Four hours.* In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in German Scientific Literature. *Three hours.* (Elective.) This Course is a required course for those students who present 4 units of German for admission.
6. German Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic German. *Three hours.* (Elective.)
8. A Course in Literary German. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

129.

*FRENCH

Mr. Bird, Mr. Adams, and Mr. Kenyon.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*

Greek or Latin for entrance, will take
4 hours of French, at once, and 12 hours of German, or
8 hours of French, at once, and 8 hours of Spanish.

V. Students presenting 3, or 4 units of French, either with or without Greek or Latin for entrance, will take
4 hours of French, at once, and 12 hours of German, or
4 hours of French, at once, and 12 hours of Spanish.

VI. Students presenting 2 units of French and 2 units of German for entrance will take
8 hours of French and 8 hours of German, or
8 hours of German and 8 hours of Spanish, or
8 hours of French and 8 hours of Spanish.

VII. Students presenting no foreign language for entrance will take
16 hours of German and 8 hours of French or Spanish, or
12 hours of German and 12 hours of French.

Some modification of the above rules will be allowed in cases of students who have credits for at least a year's work at an approved college and enter this department with advanced credits in two modern languages.

Such students will be held to have completed the modern language requirement upon obtaining sixteen hours credit in addition to that applied on the entrance requirement with a minimum of courses 1 and 2 in any language presented.

*See note at bottom of pages 72, 73.

3. Reading of French Scientific Literature. *Four hours.*
4. Reading of French Scientific Literature continued. *Four hours.* In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.
5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.) This course is a required course for those students who present 4 units of French for admission.
6. French Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic French. *Three hours.* (Elective.)
8. A Course in Literary French. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking French. *Four hours.*
3. Reading of French Scientific Literature. *Four hours.*
4. Reading of French Scientific Literature continued. *Four hours.*

In Courses 3 and 4 students of special aptitude and proficiency will be given opportunity and encouraged to do extra work.

5. Advanced Course in French Scientific Literature. *Three hours.* (Elective.) This course is a required course for those students who present 4 units of French for admission.
6. French Conversation. *Three hours.* (Elective.)
7. Commercial and Journalistic French. *Three hours.* (Elective.)
8. A course in Literary French. *Three hours.* (Elective.)

An *Elective Course* will not be given unless desired by six or more students qualified to take it.

130. SPANISH

Mr. Bird, Mr. Adams, and Mr. Kenyon.

FIRST SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
3. Reading, Conversation, and Business Correspondence. *Four hours.*

SECOND SEMESTER

1. Elementary Course. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
2. Elementary Course continued. Grammar and Reading, with constant practice in writing and speaking Spanish. *Four hours.*
3. Reading, Conversation, and Business Correspondence. *Four hours.*

131. PHILOSOPHY

FOR STUDENTS IN ARCHITECTURE

Professor Wenley, Professor Rebec.

FIRST SEMESTER

2a. Principles of Ethical, Social, and Aesthetic Evolution. *Two hours.*

This course is intended specially for (1) students of literature, classical and modern, and (2) students of history and politics. It is one of the courses recommended to students of commerce and public administration. The treatment will be of such a character as to present little difficulty to students either of literature and history, or of commerce and politics. Lectures will be given on mediæval institutions, thought, and literature; on the influence of the classical revival of the Renaissance. The principal aim of the course will be to give, on the basis of the study of mediævalism, an introduction to the origin and development of modern literary and political thought, and of modern views of society. Collateral reading; one thesis.

SECOND SEMESTER

6. Principles and Problems in Æsthetic History (Special Æsthetics). *Two hours.*

The aim of the course is to give a concrete and inductive study of æsthetic development, with a view to eliciting the ways in which man has embodied the problems of life under the forms and limitations of art. Relation of philosophy to the interpretation of art, especially of poetry. This course is recommended strongly to students of Semitic, Classical, English, and European literatures, and particularly to candidates for the Teacher's Diploma in these subjects. Lectures, reading, analysis and discussion of representative masterpieces. Work will be assigned individual students with special reference to their line of study.

132. POLITICAL ECONOMY

Professor ADAMS, Professor TAYLOR, Professor JONES, Dr. SMALLEY, MR. HARPHAM.

Consultation Hours.—The instructors in the department will have consultation hours as follows:—

Professor ADAMS, first week of each semester, daily, from 1 to 2; after that Monday and Wednesday at 3 P. M. Room 8A, T. H.

Professor TAYLOR, Tuesday and Thursday, at 12, both semesters, Room 11, T. H.

Professor JONES, first two weeks of each semester, daily, from 11 to 12. Room 8A, T. H.

Dr. SMALLEY, Monday and Wednesday, at 12, both semesters. Room 4, T. H.

FIRST SEMESTER

1. Elements of Political Economy. Lectures and quiz. *Four hours.*

This course is introductory to all other courses in political economy. The weekly quiz covers both the lectures and some standard text announced at the beginning of the semester. The ground traversed in the lectures includes the usual topics, Production, Exchange, and Distribution; but Public Finance will be reserved for a special course (4).

5. Problems in Political Economy. Lectures and quiz. *Four hours.*

Course 5 (which alternates with Course 5*a*) treats in a cursory manner current problems in political economy. The problems studied are as follows: The Immigration Problem, Industrial Crises, Free Trade and Protection, The Railway Problem, The Monopoly or Trust Problem, and Taxation. It is designed as a supplement to Course 1, by which it must be preceded.

[5*a*. Social and Industrial Reforms. Lectures and Quiz. *Four hours.*

Course 5*a* (which alternates with Course 5) treats in a cursory manner of those social reforms forced upon society by the industrial development of the past century. The special problems studied are the following: Co-operation, Profit-sharing, Communism, Socialism, Factory Legislation, Workingmen's Insurance, Trades-Unions, and Industrial Federation. It is designed as a supplement to Course 1, by which it must be preceded. Omitted in 1906-1907.]

33*b*. The Manufacturer's Problem of Distribution. *Three hours.*

The requirements of marketing as they affect the technique of manufacturing will be discussed, together with the principles governing the determination of price and quality. The outlets employed in direct and indirect selling and the methods of stimulating trade will be described in detail. All efforts to regulate competition in the sale of products, whether by trade-marks, the factor system, curtailment and price agreements, pools, consolidations, or through the laws of unfair trade, will be considered.

38. Elements of Accounting. Lectures, quiz and laboratory work, with text-book. *Three hours.*

In this course the general principles of accounting are developed by the analysis of typical financial transactions. The aim is not to train bookkeepers but to show the general significance of business records, to explain the composition and critical analysis of financial statements, and, in general, to develop the subject from the managerial point of view.

41. Commercial Law. Lectures, text-book, and quiz. *Two hours.*

It is the design of this course to instruct students in the fundamental principles of law, so far as these principles pertain to the ordinary activities of business life. This course should precede Course 42.

SECOND SEMESTER

6. Transportation Problems. Lectures and quiz. *Three hours.*

Course 6 considers the social and industrial significance of modern transportation, traces the development of railway transportation in this country, and in the more important European countries, discusses the administrative and legislative organization of railway systems, studies the history of the railway problems of the United States, and pays especial attention to the experiment of control of railways through commissions. This is regarded as one of the advanced, semi-professional courses. Course 6 must be preceded by Course 1.

32. The Manufactures of the United States. Lectures and assigned readings. *Three hours.*

The evolution, present location, and condition of our chief manufacturing industries will be presented, and the relations of these industries to one another, to sources of raw materials, to transportation and market facilities, and to foreign trade. Course 32 must be preceded by Course 1.

39. The Theory and Practice of Manufacturing Costs. *Two hours.*

This course will present the methods of ascertaining the cost of producing a unit of manufactured product. In it there will be discussed (a) the methods of hiring, distributing and recording labor, (b) the methods of requisitioning, valuing and tracing labor, (c) the methods of valuing equipment and of distributing interest and depreciation expenses, (d) the theory and practice of assigning over-head expense or "factory burden."

42. Commercial Law. Text-book and quiz. *Two hours.*
This course must be preceded by Course 41, of which it is a continuation.

132a. LAW

1. Contracts. *One hour.*

133. MATHEMATICS

Professor Ziwet, Professor Markley, Assistant Professor Glover. Assistant Professor Butts, Dr. Ford, Mr. Escott, Mr. Marshall, Dr. Running, Dr. Pierce, Dr. Field, Dr. Karpinski, Mr. Garretson, Mr. Love.

Students of engineering are required to take in order Courses 1, 2, 3, 4, 5, and 6. § 42. Those admitted with a deficiency in plane trigonometry may remove it by completing Course 1*a*, but the credit thus obtained is entered on the admission, not the graduation requirements. § 150.

FIRST SEMESTER

1. Algebra and Analytic Geometry I. *Four hours.*
1*a*. Plane Trigonometry. *Two hours.*
2. Analytic Geometry II. *Four hours.*
3. Calculus. *Five hours.*
5. Calculus and Mechanics II. *Three hours.*
17. Theory of the Potential. *Three hours.* Professor Ziwet. (Elective.)
29. Harmonic Analysis I. *Two hours.* Professor Ziwet. (Elective.)

SECOND SEMESTER

1. Algebra and Analytic Geometry I. *Four hours.*
1*a*. Plane Trigonometry. *Two hours.*
2. Analytic Geometry II. *Four hours.*
2*a*. Spherical Trigonometry. *Two hours.* (Elective.)
3. Calculus. *Five hours.*
4. Calculus and Mechanics I. *Five hours.*
6. Calculus and Mechanics III. *Two hours.*
16. Advanced Mechanics. *Three hours.* Professor Ziwet. (Elective.)
30. Harmonic Analysis II. *Two hours.* Professor Ziwet. (Elective.)

Other and advanced courses are given in the Department of Literature, Science, and the Arts.

134. PHYSICS

Professor Carhart, Assistant Professor Randall, Dr. Smith, Dr. Henderson, Mr. Mellencamp, Mr. Andrews, Mr. Cole, Mr. Colby.

FIRST SEMESTER

1E. Mechanics, Sound, and Light. Lectures and recitations. *Five hours.*

For Course 1E a knowledge of plane trigonometry is indispensable. No student is admitted to the class who has not had the preparatory course in Physics.

3*b*. Physical Laboratory Work for Beginners. *Two hours.* Fee, $2.

For students in electrical engineering. Course 3*b* must be preceded by Course 1E.

3*c*. Physical Laboratory Work in Mechanical and Electrical Measurements. *Four hours.* Fee, $4.

Course 3*c* must be preceded by Course 2E. It is designed for students in civil, mechanical, chemical, marine, and architectural engineering as a preparation for the study of dynamo-electric machinery.

5. Electrical Measurements. Class and laboratory work. *Four hours.* Fee, $3. § 73.

Course 5 must be preceded by Courses 1E, 2E, 3*b* and 4 in physics; a knowledge of the calculus is required.

7. Intermediate Course in Electricity and Magnetism. *Two hours.* (Elective.)

Course 7 must be preceded by Course 2E. A knowledge of the calculus is required.

8. Theory of Heat. *Two hours.* (Elective.)

Course 8 must be preceded by Course 2E.

9. Heat. Laboratory work. *Two hours.* (Elective.)

Course 9 must be preceded or accompanied by Course 8. Fee, $2.

10. Mathematical Electricity and Magnetism. *Three hours.* (Elective.)

Course 10 must be preceded by Course 2E. A knowledge of the calculus is required.

SECOND SEMESTER

2E. Heat, Electricity, and Magnetism. Lectures and recitations. *Five hours.*

Course 2E must be preceded by Course 1E and by Course 2E in chemistry.

3*c*. Physical Laboratory Work in Mechanical and Electrical Measurements. *Four hours.* Fee, $3.

9*a*. Water-Color Drawing. Historic Ornament and Design (continued). *Three hours.* (Elective.)
10. Free-Hand Lettering. *Two hours.* (Elective.)
11. Spherical Projections. *One hour.* (Elective.)
Course 11 must be preceded by Course 4.
24. Architectural Drawing (A) IV. *Two hours.*

SUMMER SESSION

5. Advanced Projections and Stereotomy (A) (AE). *Four hours.*
21. Architectural Drawing (A) I (AE) I. *Two hours.*

141. SHOP PRACTICE

Superintendent MIGGETT; Shop-Instructors, PURFIELD, MCDONALD, COBB, BULL, STEVENSON.

The shop courses consist of actual practice in the shops, together with class-room recitations for which outside preparation is made from text-books and oral instruction.

Courses 1 and 3 may be continued by advanced students as Courses 1*a* to 3*a*.

Special arrangements are made for students who desire to take more advanced shop courses with a view to preparing themselves for teaching these subjects. § 49.

FIRST SEMESTER

1. Woodwork, Pattern-making, Forging and metal cutting operations. *Four hours.* Fee, $10.
2. Pattern-making and Foundry. *Four hours.* Fee, $10.
3. Machine Shop. *Four hours.* Fee, $10.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.

SECOND SEMESTER

1. Woodwork, Pattern-making, Forging and metal cutting operations. *Four hours.* Fee, $10.
2. Pattern-making and Foundry. *Four hours.* Fee, $10.
3. Machine Shop. *Four hours.* Fee, $10.
4. Pattern-making, Foundry and Machine Shop. *Four hours.* Fee, $10.
5. Instrument Making. *Two hours.* Fee, $5.

SUMMER SESSION

1. **Woodwork, Pattern-making, Forging and metal cutting operations.** ***Four hours.*** **Fee, $10.**
2. **Pattern-making and Foundry.** ***Four hours.*** **Fee, $10.**
3. **Machine Shop.** ***Four hours.*** **Fee, $10.**
5. **Instrument Making.** ***Two hours.*** **Fee, $5.**

142. SURVEYING

Professor J. B. Davis, Assistant Professor Merrick, Mr. Atwell, Mr. ———.

FIRST SEMESTER

1. **Surveying. Lectures, Text-book, and Field Practice.** ***Five hours.*** **§ 51.**
   The field practice in Course 1 continues during favorable weather until Christmas.
2. **Continuation of Course 1. Lectures and text-book. Topography. Transit and Stadia. Plane Table. Camera. Field Work and Drawing.** ***Five hours.***
4. **Use of Instruments.** ***One hour.*** **§ 51 (*b*).**

SECOND SEMESTER

1. **Surveying. Lectures, Text-book, and Field Practice.** ***Five hours.*** **§ 51.**
2. **Continuation of Course 1. Lectures and text-book. Topography.** Transit and Stadia. Plane Table. Camera. Field Work and Drawing. *Five hours.*
7. Geodesy. Geodetic Methods. Lectures and texts. *Three hours.* (Elective.) § 52.
   Course 7 must be preceded by Courses 1 and 2.

SUMMER SESSION

3. Field Work in Camp. *Six weeks.* § 51.
   Open only to students in civil engineering except by special permission of the Faculty.

143. CIVIL ENGINEERING

Professor Williams, Professor J. B. Davis, Assistant Professor Wrentmore, Assistant Professor Greene, Assistant Professor Tilden, Mr. Wilson, Mr. ———.

FIRST SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*

Course 1 must be preceded or accompanied by Course 5 in mathematics.

2. Theory and Analysis of Structures. Lectures and text. Four times a week. *Four hours.*

Course 2 must be preceded by Course 1.

3. Structural Design. Computations and Draughting. Five afternoons a week. *Four hours.*

5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*

Course 5 must be preceded or accompanied by Course 6 in mathematics.

6. Municipal Engineering. Lectures and text. Three times a week. *Two hours.*

Course 6 must be preceded by Course 1 and preceded or accompanied by Course 5.

8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*

Course 8 must be preceded by Course 5.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*

Course 10 must be preceded by Course 1.

SECOND SEMESTER

1. Structural Mechanics. Graphical Analysis and Strength and Resistance. Lectures, problems and text. Five times a week. *Five hours.*

Course 1 must be preceded or accompanied by Course 5 in mathematics.

4. Engineering Constructions. Lectures and text. Three times a week. *Two hours.*

Course 4 must be preceded by Course 2.

5. Hydraulics. Mechanics of Fluids and Hydraulic Motors. Lectures and text. Five times a week. *Four hours.*

Course 5 must be preceded or accompanied by Course 6 in mathematics.

7. Water Supply Engineering. Lectures and text. Four times a week. *Two hours.*

Course 7 must be preceded by Courses 1, 5, and 6.

8. Experimental Hydraulics. Lectures, computations and laboratory. Three times a week. *Three hours.*

Course 8 must be preceded by Course 5.

9. Advanced Structural Design. Lectures, computations and drawing. Three times a week. *Three hours.*

Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.

10. Testing Materials. Lectures, computations and laboratory. Two times a week. *Two hours.*

Course 10 must be preceded by Course 1.

SUMMER SESSION

11. Elements of Strength and Resistance. Text. For chemical engineers. *Two hours.*
    Course 11 must be preceded by Course 4 in mathematics and Course 2 in physics.

144. MECHANICAL ENGINEERING

Professor Cooley, Professor Denison, Professor Allen, Superintendent Migget, Assistant Professor Anderson, Assistant Professor Goulding, Assistant Professor Hazelton,
Mr. Bragg, Mr. Bursley, Mr. Emsweiler,
Mr. ———, Mr. ———.

FIRST SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
2. Sketching of Machine Details. *Three hours.*
   Course 2 must be preceded by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Courses 1 and 4 and by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
   Course 8 must be preceded by Course 4 and preceded or accompanied by Course 6 or preceded by Courses 1, 2, and 3 in civil engineering.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
   Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
11. Gas Engines. *Two hours.*
    Course 11 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 71.
Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
12. Power Plants. Power Transmission. *Two hours.*
Course 12 must be preceded by Course 3 and Course 5 in civil engineering.
14. Compressed Air and Refrigeration. *Two hours.*
Course 14 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

18. Thermodynamics (advanced). Steam Turbines. *Two hours.*
Course 18 must be preceded by Course 5.
19. Machine Design (advanced). *Three hours.*
Course 19 must be preceded by Courses 8 and 10.

20. Hydraulic Machinery. Laboratory Work.
    This course will be offered on completion of the hydraulic laboratory. § 72.
21. Design of Power Plants. *Three hours.*
    Course 21 must be preceded or accompanied by Course 12.

145. ELECTRICAL ENGINEERING

Professor Patterson, Assistant Professor Moorehouse, Assistant Professor Bailey, Mr. Higbie, Mr. ———.

FIRST SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*
   Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.
3. Alternating Current Generators and Transformers. Lectures, recitations and laboratory work. *Four hours.*
   Course 3 must be preceded by Course 2.
5. Design of Electrical Machinery and Appliances. Lectures, recitations and drawing. *Four hours.*
   Course 5 must be preceded by Course 1 or 2.
7. Photometry of Electric Lamps. Lectures, recitations and laboratory work. *One hour.*
   Course 7 must be preceded by Course 1 or 2.
9. Storage Battery Installations. Lectures, and laboratory work. *Two hours.*
11. Electric Generating Stations and Sub-Stations. Lectures. *One hour.*
    Course 11 must be preceded by Course 1 or Course 2.
13. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Lectures and recitations. *Two hours.*
    Course 13 must be preceded or accompanied by Course 1 or 2.
15. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
    Course 15 must be preceded or accompanied by Course 13.
17. Applied Electrical Engineering. Lectures and recitations. *Two hours.*
    Course 17 must be preceded by Course 1 or 2. Not open to electrical engineers.

SECOND SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*
   Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 2 must be preceded by Courses 1, 2, 3, 4, and 5 in physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. Lectures, recitations and laboratory work. *Two hours.*
Course 4 must be preceded by Course 1 or 4.

6. Design of Electrical Machinery and Appliances. Drawing. *Two hours.*
Course 6 must be preceded by Course 5, of which Course 6 is the continuation.

8. Electric Railways. Lectures and recitations. *Two hours.*
Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. Lectures and reading. *Two hours.*

12. Distribution of Electricity. Lectures. *Two hours.*
Course 12 must be preceded by Course 1 or 2.

14. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 14 must be preceded by Course 13.

SUMMER SESSION

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. Course 1 is intended for students not candidates in electrical engineering.

146. CHEMICAL ENGINEERING

(See *Chemistry and Chemical Engineering.* § 135.)

147. NAVAL ARCHITECTURE AND MARINE ENGINEERING

Professor Cooley, Professor Sadler, Mr. Bragg.

FIRST SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*

2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*

3. Naval Architecture. Strength of ships and preliminary design. *Two hours.*
Course 3 must be preceded or accompanied by Course 2.

5. Naval Architecture. Mould loft and structural drawing. *Two hours.*

6. Naval Architecture. Ship drawing and design. *Three hours.*
8. Marine Boilers. Lectures and recitations. *One hour.*
9. Marine Engines. Lectures and recitations. *Two hours.*
   Course 9 must be preceded or accompanied by Course 3 in mechanical engineering.
10. Marine Engine and Boiler Design. *Two hours.*

SECOND SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
4. Naval Architecture. Stability, resistance and propulsion of ships. *Four hours.*
5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
7. Naval Architecture. Ship drawing and design. *Three hours.*
9. Marine Engines. Lectures and recitations. *Two hours.*
   Course 9 must be preceded or accompanied by Course 3 in mechanical engineering.
11. Marine Engine and Boiler Drawing and Design. *Two hours.*

PRIMARILY FOR GRADUATES

12. Experimental Tank Work. *Two hours.*
13. Ship and Engine Specifications. *Two hours.*
14. Pumping and Ventilation. *One hour.*
15. Advanced Reading. *Three hours.*
16. Advanced Drawing. *Five hours.*

Students wishing to specialize in Marine Engine and Boiler Design will elect Courses 6 and 7 as *two hours* each, and Courses 10 and 11 as *three hours* each.

148.

ARCHITECTURE*

Professor LORCH.

FIRST SEMESTER

1. Elementary Design. An introductory course to the field of artistic design. *Three hours.*
2. Elements of Architecture. Lectures, drawing exercises, and rendering in wash. *Two hours.*
4. Architectural Design I. Problems in the planning and designing of buildings. *Three hours.*
   Course 4 must be preceded by Courses 1 and 2.

---

*Courses whose titles are followed by (A) are intended for students in Architecture only; those followed by (AE), for students in Architectural Engineering only; and courses whose titles are not followed by (A) or (AE), are open to both students in Architecture and Architectural Engineering.

5. Architectural Design II. Problems in the planning and designing of buildings. *Three hours.*

7. Architectural Design (A) IV. Problems in the planning and designing of buildings. *Six hours.*

   Course 7 must be preceded by Courses 1, 2, 4, 5, and 6. Not offered in 1906-7.

9. Architectural Design (AE) III. Problems in the planning and designing of buildings. *Two hours.*

   Course 9 must be preceded by Courses 1, 2, 4, and 5.

11. History of Architecture; Ancient. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

13. History of Architecture; Renaissance. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

    Not offered in 1906-7.

17. The Allied Arts of Design. Lectures, research. *Two hours.*

    Not offered in 1906-7.

23. Building Construction (A) II. Building materials and processes; working drawings. *Two hours.*

    Not offered in 1906-7.

24. Building Sanitation. *One hour.*

SECOND SEMESTER

2. Elements of Architecture. Lectures, drawing exercises, and rendering in wash. *Two hours.*

4. Architectural Design I. Problems in the planning and designing of buildings. *Three hours.*

   Course 4 must be preceded by Courses 1 and 2.

5. Architectural Design II. Problems in the planning and designing of buildings. *Three hours.*

   Course 5 must be preceded by Courses 1, 2, and 4.

6. Architectural Design (A) III. Problems in the planning and designing of buildings. *Five hours.*

   Course 6 must be preceded by Courses 1, 2, 4, and 5.

8. Architectural Design (A) V. Problems in the planning and designing of buildings. *Six hours.*

   Course 8 must be preceded by Courses 1, 2, 4, 5, 6, and 7. Not offered in 1906-7.

10. Architectural Design (AE) IV. Problems in the planning and designing of buildings. *Two hours.*

    Course 10 must be preceded by Courses 1, 2, 4, 5, and 9.

12. History of Architecture; Medieval. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

14. History of Architecture; Modern. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*
Not offered in 1906-7.

18. Architectural Composition. Illustrated lectures. *One hour.*
Not offered in 1906-7.

19. Architectural Seminar. Current architectural work and literature. *One hour.*
Not offered in 1906-7.

21. Specifications. Discussion and writing of specifications. *One hour.*
Not offered in 1906-7.

22. Building Construction I. Building materials and processes; working drawings. *Three hours.*
Not offered in 1906-7.

SEQUENCE OF STUDIES

149. The work of the first year is the same for all regular students. At the end of the first year, the student makes his choice to continue in the civil engineering, the mechanical engineering, the electrical engineering, the chemical engineering, naval architecture, marine engineering, architecture, or the architectural engineering course. The student, in civil, mechanical or electrical engineering, who desires to graduate in marine engineering, will elect the work in naval architecture and marine engineering in his *fourth* year, as specified in § 158.

There is a limited opportunity for electives in some semesters, and credits obtained in advance at entrance may leave a place for substitutions. After the first year the student may take work to the amount of *eighteen hours* per week, as arranged by the classification committee; but *he may wisely, in some cases, take a smaller number of hours,* if he can in that way do more thorough work. See "Rules Governing Election of Studies," § 123.

150. NEW ORDER OF STUDIES

The order of studies for students entering *after* commencement, 1906, and thereafter, is as follows. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond with this order.

One hundred and forty hours will hereafter be required for graduation, the thesis being omitted.

The order of studies for the first year is the same for all students.

First Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 1,	4 hours	Mathematics 2,	4 hours
*Language,	4 hours	*Language,	4 hours
†Chemistry 2E,	4 hours	†Drawing 4,	4 hours
or		or	
Drawing 4,	4 hours	*Chemistry* 2E,	4 hours
†English 1,	4 hours	†Shop Work 1,	4 hours
or		or	
Shop Work 1,	4 hours	*English* 1,	4 hours
‡Gymnasium Work,		‡Gymnasium Work,	
	—		—
	16 hours		16 hours

Students who have not passed plane trigonometry and chemistry for admission must omit *eight hours* of the work listed for the *first semester* and substitute Mathematics 1*a* and Chemistry 1 and 1*a*.

Those who lack one of the above subjects must drop *four hours* to allow for its substitution.

Both of the above substitutions seriously disarrange the order of studies in later years, and frequently make it necessary for the student to attend the University an additional half year, and in some cases an additional full year, in order to complete the requirements for graduation. For this reason it is strongly advised that the deficiencies above noted be removed by completing the work in the Summer Session previous to entrance.

Summer Session Announcements may be obtained the latter part of March by writing to James H. Wade, Secretary of the University of Michigan.

---

*See note at bottom of pages 72, 73.

†The student taking Chemistry 2E the first semester will take Drawing 4 the second semester; likewise, the student taking English 1 the first semester will take Shop Work 1 the second semester; and *vice versa*.

‡See heavy faced type, § 121.

151.

CIVIL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Chemistry 3*a*,	4 hours	Surveying 1,	5 hours
or		or	
Drawing 5,	4 hours	Chemistry 3*a*,	4 hours
	—		—
	18 hours		19 or 18 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Mineralogy 1,	2 hours	Physics 3*c*,	4 hours
Geology 6,	3 hours	Drawing 5,	4 hours
Surveying 2,	5 hours	or	
or		Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	—		—
	18 hours		18 or 19 hours

Summer Session

Surveying 3, 6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

---

*See note at bottom of pages 72, 73.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 71.
    Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
    Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
    Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
   Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
   Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
   Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
   Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
   Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
   Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
   Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
   Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
    Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
12. Power Plants. Power Transmission. *Two hours.*
    Course 12 must be preceded by Course 3 and Course 5 in civil engineering.
14. Compressed Air and Refrigeration. *Two hours.*
    Course 14 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

18. Thermodynamics (advanced). Steam Turbines. *Two hours.*
    Course 18 must be preceded by Course 5.
19. Machine Design (advanced). *Three hours.*
    Course 19 must be preceded by Courses 8 and 10.

153. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Physics 3*b*,	2 hours	Physics 4,	2 hours
Drawing 6,	2 hours	Drawing 6,	2 hours
	18 hours		18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	18 hours		17 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		12 hours
	15 hours		

---

*See note at bottom of pages 72, 73.

PRIMARILY FOR GRADUATES

13. Heating and Ventilation. *Two hours.* § 71.
Course 13 must be preceded by Course 3.
15. Hydraulic Machinery (advanced). *Two hours.*
Course 15 must be preceded by Course 5 in civil engineering.
16. Laboratory Work. Advanced Course. *Two hours.*
Course 16 must be preceded by Courses 7 and 9.

SECOND SEMESTER

1. Principles of Mechanism. *Four hours.*
Course 1 must be preceded by Course 1 in mathematics and by Course 4 in drawing.
3. Steam Engines and other Heat Engines. *Four hours.*
Course 3 must be preceded by Courses 1 and 2 in physics and by Course 4 in mathematics.
4. Machine Design. Machine Tools. *Three hours.*
Course 4 must be preceded by Course 1.
5. Thermodynamics. *Three hours.*
Course 5 must be preceded by Course 3.
6. Theory of Machine Design and Valve Gears. *Five hours.*
Course 6 must be preceded by Course 1 in civil engineering.
7. Steam Laboratory. Calibration of Instruments and Measurement of Power. *Two hours.* Fee, $5.
Course 7 must be preceded by Course 3.
8. Machine Design. Hoisting Machinery. *Three hours.*
Course 8 must be preceded by Courses 4 and 6.
9. Steam Laboratory. Testing of Heat Engines and Boilers. *Three hours.* Fee, $5.
Course 9 must be preceded by Course 7.
10. Machine Design. Boilers and Engines. *Three hours.*
Course 10 must be preceded by Course 3 and Course 1 in civil engineering.
12. Power Plants. Power Transmission. *Two hours.*
Course 12 must be preceded by Course 3 and Course 5 in civil engineering.
14. Compressed Air and Refrigeration. *Two hours.*
Course 14 must be preceded by Course 5.

PRIMARILY FOR GRADUATES

18. Thermodynamics (advanced). Steam Turbines. *Two hours.*
Course 18 must be preceded by Course 5.
19. Machine Design (advanced). *Three hours.*
Course 19 must be preceded by Courses 8 and 10.

20. **Hydraulic Machinery. Laboratory Work.**
This course will be offered on completion of the hydraulic laboratory. § 72.

21. Design of Power Plants. ***Three hours.***
Course 21 must be preceded or accompanied by Course 12.

145. ELECTRICAL ENGINEERING

Professor Patterson, Assistant Professor Moorehouse, Assistant Professor Bailey, Mr. Higbie, Mr. ———.

FIRST SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.

3. Alternating Current Generators and Transformers. Lectures, recitations and laboratory work. *Four hours.*
Course 3 must be preceded by Course 2.

5. Design of Electrical Machinery and Appliances. Lectures, recitations and drawing. *Four hours.*
Course 5 must be preceded by Course 1 or 2.

7. Photometry of Electric Lamps. Lectures, recitations and laboratory work. *One hour.*
Course 7 must be preceded by Course 1 or 2.

9. Storage Battery Installations. Lectures, and laboratory work. *Two hours.*

11. Electric Generating Stations and Sub-Stations. Lectures. *One hour.*
Course 11 must be preceded by Course 1 or Course 2.

13. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Lectures and recitations. *Two hours.*
Course 13 must be preceded or accompanied by Course 1 or 2.

15. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*
Course 15 must be preceded or accompanied by Course 13.

17. Applied Electrical Engineering. Lectures and recitations. *Two hours.*
Course 17 must be preceded by Course 1 or 2. Not open to electrical engineers.

SECOND SEMESTER

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*
Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. Lectures, recitations and laboratory work. *Four hours.*

   Course 2 must be preceded by Courses 1, 2, 3, 4, and 5 in physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. Lectures, recitations and laboratory work. *Two hours.*

   Course 4 must be preceded by Course 1 or 4.

6. Design of Electrical Machinery and Appliances. Drawing. *Two hours.*

   Course 6 must be preceded by Course 5, of which Course 6 is the continuation.

8. Electric Railways. Lectures and recitations. *Two hours.*

   Course 8 must be preceded by Course 1 or 2.

10. Alternating Current Phenomena. Lectures and reading. *Two hours.*

12. Distribution of Electricity. Lectures. *Two hours.*

    Course 12 must be preceded by Course 1 or 2.

14. Telephone, Telegraph, Fire Alarm, Railway Signal, and Related Apparatus. Laboratory work. *Two hours.*

    Course 14 must be preceded by Course 13.

SUMMER SESSION

1. Dynamo-Electric Machinery. Lectures, recitations and laboratory work. *Four hours.*

   Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3*c*) in physics. Course 1 is intended for students not candidates in electrical engineering.

146. CHEMICAL ENGINEERING

(See *Chemistry and Chemical Engineering.* § 135.)

147. NAVAL ARCHITECTURE AND MARINE ENGINEERING

Professor Cooley, Professor Sadler, Mr. Bragg.

FIRST SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*

2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*

3. Naval Architecture. Strength of ships and preliminary design. *Two hours.*

   Course 3 must be preceded or accompanied by Course 2.

5. Naval Architecture. Mould loft and structural drawing. *Two hours.*

6. Naval Architecture. Ship drawing and design. *Three hours.*
8. Marine Boilers. Lectures and recitations. *One hour.*
9. Marine Engines. Lectures and recitations. *Two hours.*
   Course 9 must be preceded or accompanied by Course 3 in mechanical engineering.
10. Marine Engine and Boiler Design. *Two hours.*

SECOND SEMESTER

1. Naval Architecture. Structural Design. Lectures and recitations. *One hour.*
2. Naval Architecture. Ship calculations. Lectures and recitations. *Two hours.*
4. Naval Architecture. Stability, resistance and propulsion of ships. *Four hours.*
5. Naval Architecture. Mould loft and structural drawing. *Two hours.*
7. Naval Architecture. Ship drawing and design. *Three hours.*
9. Marine Engines. Lectures and recitations. *Two hours.*
   Course 9 must be preceded or accompanied by Course 3 in mechanical engineering.
11. Marine Engine and Boiler Drawing and Design. *Two hours.*

PRIMARILY FOR GRADUATES

12. Experimental Tank Work. *Two hours.*
13. Ship and Engine Specifications. *Two hours.*
14. Pumping and Ventilation. *One hour.*
15. Advanced Reading. *Three hours.*
16. Advanced Drawing. *Five hours.*

Students wishing to specialize in Marine Engine and Boiler Design will elect Courses 6 and 7 as *two hours* each, and Courses 10 and 11 as *three hours* each.

148. ARCHITECTURE*

Professor Lorch.

FIRST SEMESTER

1. Elementary Design. An introductory course to the field of artistic design. *Three hours.*
2. Elements of Architecture. Lectures, drawing exercises, and rendering in wash. *Two hours.*
4. Architectural Design I. Problems in the planning and designing of buildings. *Three hours.*
   Course 4 must be preceded by Courses 1 and 2.

---

*Courses whose titles are followed by (A) are intended for students in Architecture only; those followed by (AE), for students in Architectural Engineering only; and courses whose titles are not followed by (A) or (AE), are open to both students in Architecture and Architectural Engineering.

5. Architectural Design II. Problems in the planning and designing of buildings. *Three hours.*

7. Architectural Design (A) IV. Problems in the planning and designing of buildings. *Six hours.*

   Course 7 must be preceded by Courses 1, 2, 4, 5, and 6. Not offered in 1906-7.

9. Architectural Design (AE) III. Problems in the planning and designing of buildings. *Two hours.*

   Course 9 must be preceded by Courses 1, 2, 4, and 5.

11. History of Architecture; Ancient. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

13. History of Architecture; Renaissance. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

    Not offered in 1906-7.

17. The Allied Arts of Design. Lectures, research. *Two hours.*

    Not offered in 1906-7.

23. Building Construction (A) II. Building materials and processes; working drawings. *Two hours.*

    Not offered in 1906-7.

24. Building Sanitation. *One hour.*

SECOND SEMESTER

2. Elements of Architecture. Lectures, drawing exercises, and rendering in wash. *Two hours.*

4. Architectural Design I. Problems in the planning and designing of buildings. *Three hours.*

   Course 4 must be preceded by Courses 1 and 2.

5. Architectural Design II. Problems in the planning and designing of buildings. *Three hours.*

   Course 5 must be preceded by Courses 1, 2, and 4.

6. Architectural Design (A) III. Problems in the planning and designing of buildings. *Five hours.*

   Course 6 must be preceded by Courses 1, 2, 4, and 5.

8. Architectural Design (A) V. Problems in the planning and designing of buildings. *Six hours.*

   Course 8 must be preceded by Courses 1, 2, 4, 5, 6, and 7. Not offered in 1906-7.

10. Architectural Design (AE) IV. Problems in the planning and designing of buildings. *Two hours.*

    Course 10 must be preceded by Courses 1, 2, 4, 5, and 9.

12. History of Architecture; Medieval. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*

14. History of Architecture; Modern. Illustrated lectures, conferences, drawing exercises, and research. *Two hours.*
Not offered in 1906-7.

18. Architectural Composition. Illustrated lectures. *One hour.*
Not offered in 1906-7.

19. Architectural Seminar. Current architectural work and literature. *One hour.*
Not offered in 1906-7.

21. Specifications. Discussion and writing of specifications. *One hour.*
Not offered in 1906-7.

22. Building Construction I. Building materials and processes; working drawings. *Three hours.*
Not offered in 1906-7.

SEQUENCE OF STUDIES

149. The work of the first year is the same for all regular students. At the end of the first year, the student makes his choice to continue in the civil engineering, the mechanical engineering, the electrical engineering, the chemical engineering, naval architecture, marine engineering, architecture, or the architectural engineering course. The student, in civil, mechanical or electrical engineering, who desires to graduate in marine engineering, will elect the work in naval architecture and marine engineering in his *fourth* year, as specified in § 158.

There is a limited opportunity for electives in some semesters, and credits obtained in advance at entrance may leave a place for substitutions. After the first year the student may take work to the amount of *eighteen hours* per week, as arranged by the classification committee; but *he may wisely, in some cases, take a smaller number of hours,* if he can in that way do more thorough work. See "Rules Governing Election of Studies," § 123.

150. NEW ORDER OF STUDIES

The order of studies for students entering *after* commencement, 1906, and thereafter, is as follows. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond with this order.

One hundred and forty hours will hereafter be required for graduation, the thesis being omitted.

The order of studies for the first year is the same for all students.

First Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 1,	4 hours	Mathematics 2,	4 hours
*Language,	4 hours	*Language,	4 hours
†Chemistry 2E,	4 hours	†Drawing 4,	4 hours
or		or	
Drawing 4,	4 hours	*Chemistry* 2E,	4 hours
†English 1,	4 hours	†Shop Work 1,	4 hours
or		or	
Shop Work 1,	4 hours	*English* 1,	4 hours
‡Gymnasium Work,		‡Gymnasium Work,	
	—		—
	16 hours		16 hours

Students who have not passed plane trigonometry and chemistry for admission must omit *eight hours* of the work listed for the *first semester* and substitute Mathematics 1*a* and Chemistry 1 and 1*a*.

Those who lack one of the above subjects must drop *four hours* to allow for its substitution.

Both of the above substitutions seriously disarrange the order of studies in later years, and frequently make it necessary for the student to attend the University an additional half year, and in some cases an additional full year, in order to complete the requirements for graduation. For this reason it is strongly advised that the deficiencies above noted be removed by completing the work in the Summer Session previous to entrance.

Summer Session Announcements may be obtained the latter part of March by writing to James H. Wade, Secretary of the University of Michigan.

---

*See note at bottom of pages 72, 73.

†The student taking Chemistry 2E the first semester will take Drawing 4 the second semester; likewise, the student taking English 1 the first semester will take Shop Work 1 the second semester; and *vice versa*.

‡See heavy faced type, § 121.

151.

CIVIL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Chemistry 3*a*,	4 hours	Surveying 1,	5 hours
or		or	
Drawing 5,	4 hours	Chemistry 3*a*,	4 hours
	—		—
	18 hours		19 or 18 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Mineralogy 1,	2 hours	Physics 3*c*,	4 hours
Geology 6,	3 hours	Drawing 5,	4 hours
Surveying 2,	5 hours	or	
or		Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 1,	4 hours
	—		—
	18 hours		18 or 19 hours

Summer Session

Surveying 3, 6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

---

*See note at bottom of pages 72, 73.

152. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mechanics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Shop Work 2,	4 hours	Shop Work 3,	4 hours
or		or	
Shop Work 3,	4 hours	Shop Work 2,	4 hours
	18 hours		18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 2,	3 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 3,	4 hours	or	
		Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			17 or 16 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Surveying 4,	2 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 8,	3 hours
or		or	
Mech. Engineering 5,	3 hours	Mech. Engineering 9,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
or		Law 1,	2 hours
Mech. Engineering 8,	3 hours		
Marine Engineering 9,	2 hours		12 hours
	16 or 17 hours		

---

*See note at bottom of pages 72, 73.

153. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Physics 3*b*,	2 hours	Physics 4,	2 hours
Drawing 6,	2 hours	Drawing 6,	2 hours
	18 hours		18 hours

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	18 hours		17 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		
	15 hours		12 hours

---

*See note at bottom of pages 72, 73.

154. CHEMICAL

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Mech. Engineering 1,	4 hours	Chemistry 3*a*,	4 hours
	18 hours		18 hours

Summer Session

Chemistry 3*b*,	4 hours
Civil Engineering 11,	2 hours
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 5,	5 hours	Chemistry 28,	5 hours
Chemistry 7,	5 hours	Chemistry 38,	5 hours
Chemistry 33,	5 hours	Physics 3*c*,	4 hours
Mech. Engineering 4,	3 hours	Mech. Engineering 3,	4 hours
	18 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	2 hours		5 hours
Surveying 4,	2 hours		
Elect. Engineering 1,	4 hours		
	10 hours		

155. MARINE

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Mech. Engineering 1,	4 hours	Physics 3*c*,	4 hours
	18 hours		18 hours

---

*See note at bottom of pages 72, 73.

Summer Session

Chemistry 3*a*,	4 hours
Metallurgy 1,	2 hours
	—
	6 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Civil Engineering 1,	5 hours	Civil Engineering 5,	4 hours
Mech. Engineering 3,	4 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 4,	3 hours	Mech. Engineering 7,	2 hours
Naval Architecture 1,	1 hour	Elect. Engineering 1,	4 hours
Naval Architecture 5,	2 hours	Naval Architecture 2,	2 hours
	—		—
	18 hours		17 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 6,	5 hours	Surveying 4,	2 hours
Mech. Engineering 9,	3 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	2 hours	Marine Engineering 11,	2 hours
Marine Engineering 10,	1 hour		—
	—		13 hours
	16 hours		

156. ARCHITECTURE

Summer Session

Drawing 5,	4 hours
Drawing 21,	2 hours
	—
	6 hours

Second Year

FIRST SEMESTER		SECOND SEMESTER	
*Language,	4 hours	Mathematics 3,	5 hours
Physics 1,	4 hours	*Language,	4 hours
Drawing 22,	4 hours	Physics 2,	4 hours
Architecture 1,	2 hours	Architecture 4,	3 hours
Architecture 2,	2 hours	Architecture 12,	2 hours
Architecture 11,	2 hours		—
	—		18 hours
	18 hours		

---

*See note at bottom of pages 72, 73.

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 4,	5 hours	Geology 6,	3 hours
Political Econ. 41,	2 hours	Civil Engineering 11,	2 hours
Drawing 23,	5 hours	Architecture 6,	5 hours
Architecture 5,	3 hours	Architecture 14,	2 hours
Architecture 13,	2 hours	Architecture 18,	1 hour
Architecture 17,	2 hours	Architecture 21,	1 hour
		Architecture 22,	3 hours
	19 hours		17 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Greek 8,	3 hours	Latin 10,	3 hours
Philosophy 2,	2 hours	Philosophy 6,	2 hours
Mech. Engineering 13,	2 hours	Drawing 24,	2 hours
Architecture 7,	6 hours	Architecture 8,	6 hours
Architecture 23,	2 hours	Architecture 19,	1 hour
Architecture 24,	1 hour		
	16 hours		14 hours

157. ARCHITECTURAL ENGINEERING

Summer Session

Drawing 5,	4 hours
Drawing 21,	2 hours
	6 hours

Second Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 3,	5 hours	Mathematics 4,	5 hours
*Language,	4 hours	*Language,	4 hours
Physics 1E,	5 hours	Physics 2E,	5 hours
Architecture 1,	2 hours	Architecture 2,	2 hours
Architecture 11,	2 hours	Architecture 12,	2 hours
	18 hours		18 hours

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mech. Engineering 3,	4 hours
Physics 3*c*,	4 hours	Elect. Engineering 1,	4 hours
Drawing 25,	2 hours	Architecture 5,	3 hours
Civil Engineering 1,	5 hours	Architecture 14,	2 hours
Architecture 4,	3 hours	Architecture 21,	1 hour
Architecture 13,	2 hours	Architecture 22,	3 hours
	19 hours		17 hours

---

*See note at bottom pages 72, 73

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Greek 8,	3 hours	Latin 10,	3 hours
Political Econ. 41,	2 hours	Geology 6,	3 hours
Mech. Engineering 13,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 9,	3 hours
Civil Engineering 3,	4 hours	Architecture 10,	2 hours
Architecture 9,	2 hours		—
Architecture 24,	1 hour		13 hours
	—		
	18 hours		

158. Students who have completed three years of the civil, mechanical, or electrical courses may change to the course in Marine Engineering by taking the following work.

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 6,	5 hours	Civil Engineering 5,	4 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 5,	3 hours
Naval Architecture 2,	2 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	1 hour	Marine Engineering 11,	2 hours
Marine Engineering 10,	2 hours		—
	—		18 hours
	17 hours		

159. OLD ORDER OF STUDIES

In order that students who entered *prior* to commencement, 1905, may receive as much advantage as possible from the re-arranged schedules, (See New Order of Studies, page 98), the following order of studies has been authorized. It is not absolutely fixed, but the student is advised to adhere to it closely to avoid conflicts, as the days and hours assigned to the several courses are arranged to correspond to this order.

Students working under the old order of studies who entered *prior* to commencement, 1904, are permitted a choice of preparing a thesis for graduation, or, of taking an amount of work elected from among the courses offered in the Department of Engineering but not required, the equivalent of a thesis, as may be determined by the head of the department in which the student seeks his degree.

CIVIL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Class of 1908 Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Mineralogy 1,	2 hours	Physics 3*c*,	4 hours
Geology 6,	3 hours	Drawing 5,	4 hours
Surveying 2,	5 hours	or	
or		Surveying 2,	5 hours
Surveying 1,	5 hours	Civil Engineering 5,	4 hours
	—	Mech. Engineering 1,	4 hours
	18 hours		—
			18 or 19 hours

Summer Session

Surveying 3, 6 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

Class of 1907 Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Metallurgy 1,	2 hours	Civil Engineering 4,	2 hours
Civil Engineering 2,	4 hours	Civil Engineering 7,	2 hours
Civil Engineering 3,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 6,	2 hours	Mech. Engineering 8,	3 hours
Elect. Engineering 1,	4 hours	Marine Engineering 9,	2 hours
	—		—
	16 hours		13 hours

160. MECHANICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Class of 1908 Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3c,	4 hours	Civil Engineering 1,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 4,	3 hours
Mech. Engineering 2,	3 hours	Mech. Engineering 5,	3 hours
Mech. Engineering 3,	4 hours	or	
	—	Mech. Engineering 7,	2 hours
	18 hours	Elect. Engineering 1,	4 hours
			—
			17 or 16 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Surveying 4,	2 hours
Mech. Engineering 7,	2 hours	Mech. Engineering 8,	3 hours
or		or	
Mech. Engineering 5,	3 hours	Mech. Engineering 9,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 9,	3 hours	Mech. Engineering 12,	2 hours
or		Law 1,	2 hours
Mech. Engineering 8,	3 hours		—
Marine Engineering 3,	2 hours		12 hours
	—		
	16 or 17 hours		

Class of 1907 Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Civil Engineering 5,	4 hours	Mech. Engineering 8,	3 hours
Mech. Engineering 7,	2 hours	or	
or		Mech. Engineering 9,	3 hours
Mech. Engineering 5,	3 hours	Mech. Engineering 10,	3 hours
Mech. Engineering 6,	5 hours	Mech. Engineering 12,	2 hours
Mech. Engineering 9,	3 hours	Law 1,	2 hours
or			—
Mech. Engineering 8,	3 hours		10 hours
Marine Engineering 3,	2 hours		
	—		
	16 or 17 hours		

161. ELECTRICAL

After completing his third year of this course a student may, if he desire, change to the course in Marine Engineering by taking the subjects indicated in § 158 during his fourth year.

Class of 1908 **Third Year**

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 5,	4 hours	Physics 12,	3 hours
Surveying 4,	2 hours	Mech. Engineering 1,	4 hours
Shop Work 4,	4 hours	or	
or		Shop Work 4,	4 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
Civil Engineering 1,	5 hours	Elect. Engineering 2,	4 hours
	—		—
	18 hours		17 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		—
	—		12 hours
	15 hours		

Class of 1907 **Fourth Year**

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 4,	3 hours	Civil Engineering 5,	4 hours
Elect. Engineering 3,	4 hours	Elect. Engineering 4,	2 hours
Elect. Engineering 5,	4 hours	Elect. Engineering 8,	2 hours
Elect. Engineering 7,	1 hour	Elect. Engineering 12,	2 hours
Elect. Engineering 11,	1 hour	Elect. Engineering 14,	2 hours
Elect. Engineering 13,	2 hours		—
	—		12 hours
	15 hours		

162. CHEMICAL

Class of 1908 **Third Year**

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 5,	5 hours	Physics 3c,	4 hours
Chemistry 7,	5 hours	Chemistry 28,	5 hours
Chemistry 33,	5 hours	Chemistry 38,	5 hours
Mech. Engineering 1,	4 hours	Mech. Engineering 3,	4 hours
	—		—
	19 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	2 hours		—
Surveying 4,	2 hours		5 hours
Mech. Engineering 4,	3 hours		
Elect. Engineering 1,	4 hours		
	—		
	13 hours		

Class of 1907

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Chemistry 35,	2 hours	Chemistry 39,	5 hours
Metallurgy 1,	2 hours		—
Surveying 4,	2 hours		5 hours
Mech. Engineering 4,	3 hours		
Elect. Engineering 1,	4 hours		
	—		
	13 hours		

163.

MARINE

Class of 1908

Third Year

FIRST SEMESTER		SECOND SEMESTER	
Mathematics 5,	3 hours	Mathematics 6,	2 hours
Physics 3*c*,	4 hours	Civil Engineering 5,	4 hours
Civil Engineering 1,	5 hours	Mech. Engineering 3,	4 hours
Mech. Engineering 4,	3 hours	Mech. Engineering 7,	2 hours
Naval Architecture 1,	1 hour	Elect. Engineering 1,	4 hours
Naval Architecture 5,	2 hours	Naval Architecture 2,	2 hours
	—		—
	18 hours		18 hours

Fourth Year

FIRST SEMESTER		SECOND SEMESTER	
Mech. Engineering 5,	3 hours	Surveying 4,	2 hours
Mech. Engineering 6,	5 hours	Naval Architecture 4,	4 hours
Naval Architecture 3,	2 hours	Naval Architecture 7,	3 hours
Naval Architecture 6,	3 hours	Marine Engineering 9,	2 hours
Marine Engineering 8,	1 hour	Marine Engineering 11,	2 hours
Marine Engineering 10,	2 hours		—
	—		13 hours
	16 hours		

In Shop Practice:—Courses 1, 2, 3.
In Surveying:—Course 4.
In Civil Engineering:—Courses 1, 5.
In Mechanical Engineering:—Courses 1, 3, 4, 5, 6, 7, 8, 9, 10, 12.
In Electrical Engineering:—Course 1.
In Marine Engineering:—Course 9.
In Law:—Course 1.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

In Electrical Engineering

167. To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Electrical Engineering, the student must satisfactorily complete courses as follows:

In English:—Course 1.
In German, French, and Spanish:—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.
In Mathematics:—Courses 1, 2, 3, 4, 5, 6.
In Physics:—Courses 1E, 2E, 3*b*, 4, 5, 12.
In Chemistry:—Courses 2E, 3*a*.
In Metallurgy:—Course 1.
In Drawing:—Courses 4, 6.
In Shop Practice:—Courses 1, 4
In Surveying:—Course 4.
In Civil Engineering:—Courses 1, 5.
In Mechanical Engineering:—Courses 1, 3, 4.
In Electrical Engineering:—Courses 2, 3, 4, 5, 7, 8, 11, 12, 13, 14.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

In Chemical Engineering

168. To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Chemical Engineering, the student must satisfactorily complete courses as follows:

In English:—Course 1.
In German, French, and Spanish:—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.
In Mathematics:—Courses 1, 2, 3, 4.
In Physics:—Courses 1E, 2E, 3*c*.
In Chemistry:—Courses 2E, 3*a*, 3*b*, 5, 7, 28, 33, 35, 38, 39.
In Metallurgy:—Course 1.
In Drawing:—Course 4.

In Shop Practice:—Course 1.
In Surveying:—Course 4.
In Civil Engineering:—Course 11.
In Mechanical Engineering:—Courses 1, 3, 4.
In Electrical Engineering:—Course 1.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

In Marine Engineering

169. To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Marine Engineering, the student must satisfactorily complete courses as follows:

In English:—Course 1.

In German, French, and Spanish:—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.

In Mathematics:—Courses 1, 2, 3, 4, 5, 6.
In Physics:—Courses 1E, 2E, 3*c*.
In Chemistry:—Courses 2E, 3*a*.
In Metallurgy:—Course 1.
In Drawing:—Course 4.
In Shop Practice:—Course 1.
In Surveying:—Course 4.
In Civil Engineering:—Courses 1, 5.
In Mechanical Engineering:—Courses 1, 3, 4, 5, 6, 7.
In Electrical Engineering:—Course 1.

In Naval Architecture and Marine Engineering:—Courses 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

Or the student may take the civil, mechanical, or electrical course for three years and do the work stated in § 158 for the fourth year.

In Architecture

170. To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Architecture, the student must satisfactorily complete the courses given below. These requirements are subject to such modification as may be found necessary.

In Greek:—Course 8.
In Latin:—Course 10.
In English:—Course 1.

In German, French, and Spanish:—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.

In Philosophy:—Courses 2, 6.

In Political Economy:—Course 41.

In Mathematics:—Courses 1, 2, 3, 4.

In Physics:—Courses 1, 2.

In Chemistry:—Course 2E.

In Geology:—Course 6.

In Drawing:—Courses 4, 5, 21, 22, 23, 24.

In Shop Practice:—Course 1.

In Civil Engineering:—Course 11.

In Mechanical Engineering:—Course 13.

In Architecture:—Courses 1, 2, 4, 5, 6, 7, 8, 11, 12, 13, 14, 17. 18, 19, 21, 22, 23, 24.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

In Architectural Engineering

171 To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Architectural Engineering, the student must satisfactorily complete the courses given below. These requirements are subject to such modifications as may be found necessary.

In Greek:—Course 8.

In Latin:—Course 10.

In English:—Course 1.

In German, French, and Spanish:—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.

In Political Economy:—Course 41.

In Mathematics:—Courses 1, 2, 3, 4, 5.

In Physics:—Courses 1E, 2E, 3c.

In Chemistry:—Course 2E.

In Geology:—Course 6.

In Drawing:—Courses 4, 5, 21, 25.

In Shop Practice:—Course 1.

In Civil Engineering:—Courses 1, 2, 3, 4, 9.

In Mechanical Engineering:—Courses 3, 13.

In Electrical Engineering:—Course 1.

In Architecture:—Courses 1, 2, 4, 5, 9, 10, 11, 12, 13, 14, 21, 22, 24.

In Elective Studies, taken in the Department of Engineering, or in the Department of Literature, Science, and the Arts:—an amount sufficient to secure in all *one hundred and forty hours of credit.*

GRADUATE COURSES

The Degree of Master of Science

172. A candidate for the degree of Master of Science in Engineering or in Architecture must have previously received the corresponding degree of Bachelor of Science from this Department, or, if graduated elsewhere, must satisfy the Faculty that he possesses equivalent attainments.

He must pursue, for at least one year, in residence at the University, advanced work upon a selected Major Subject and shall present a satisfactory thesis which must be a contribution to Engineering, or equivalent to at least twenty hours of work. In addition he shall select from approved minor subjects and carry on an amount of work equivalent to at least fifteen hours.

All work for this degree will be under the direction of a Committee, of which the Professor in charge of the Major shall be Chairman, and the Committee will be composed of the members of the Faculty under whom the several subjects are taken up, and the candidate will be required to pass before the Committee an examination covering Major, Minors, and Thesis, previous to recommendation for the degree. Fee, see § 12.

The Degrees of Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Naval Architect, Marine Engineer, Architect, and Architectural Engineer.

173. These advanced degrees will be conferred only upon persons who have proved their ability to plan and direct professional work or original investigation in applied science.

A candidate for any of these degrees must have received a Bachelor's or an equivalent degree from an approved College, at least five years before registration for the advanced degree. He must have been engaged in professional work, in responsible charge of the same for at least one year, and must present at the time of registration a detailed account of his professional experience to that time, which must be approved by the heads of the departments of Engineering.

He must have pursued before receiving the degree an amount of advanced study equivalent to at least one year's work at the University, which work must have been performed under the direction of the above committee of the Faculty, or be approved by them.

Those who have received the degree of Master of Science from this Department may be excused from part of the advanced study required, in case the work done for the master's degree is, in the opinion of the committee, acceptable towards the higher degree.

He must in addition to this present a satisfactory thesis giving evidence of his professional attainments and his fitness to receive the degree sought. Fee, see § 12.

SCHEDULE OF EXAMINATIONS

In 1906-1907 the Examination Periods begin as follows: First Semester, Friday, Feb. 1; Second Semester, Friday, June 7.

Time of Exercise *	Monday 8	Monday 9	Monday 10	Monday 11	Monday 1	Monday 2	Monday 3
Time of Examination	Monday 8-10	Tuesday 8-10	Thursday 8-10	Friday 8-10	Thursday 4-6	Tuesday 2-4	Wednesday 2-4
Time of Exercise	Tuesday 8	Tuesday 9	Tuesday 10	Tuesday 11	Tuesday 1	Tuesday 2	Tuesday 3
Time of Examination	Saturday 8-10	Wednesday 8-10	Monday 2-4	Thursday 2-4	Friday 4-6	Saturday 4-6	Friday 2-4
Time of Exercise	Wednesday 8	Wednesday 9	Wednesday 10	Wednesday 11	Wednesday 1	Wednesday 2	Wednesday 3
Time of Examination	Saturday 10-12	Monday 10-12	Friday 10-12	Wednesday 10-12	Monday 4-6	Tuesday 10-12	Thursday 10-12

* NOTE: By the Time of Exercise is meant the time of the first exercise of the week in any given course. For example: If a course is given Monday at 3, Wednesday at 3, and Friday at 10, it is said to be given Monday at 3. By referring to Monday 3, in the schedule, it will be seen that the examination falls upon Wednesday, 2-4. Examinations in shop work are held Saturday 2-4, Tuesday 4-6, and Wednesday 4-6. For further information concerning shop examinations consult the Superintendent of shops.

175. REGISTER OF STUDENTS FOR THE YEAR 1905-6

RESIDENT GRADUATES

NAME	RESIDENCE
Joel Martin Barnes, B.S. [Ch.E.], 1905, ***Holder of Michigan Gas Association Fellowship***	*Quincy*
Alexander MacDonald Graver, B.S. [M.E], 1905	*Chicago, Ill.*
Ambrose Pond Merrill, B.S. [C.E.], 1904, *University of Utah*	*Richmond, Utah*
Horace Winchester Miller, Jr., B.S. [Mar.E], 1905	*Traverse City*
Ralzemond Drake Parker, B.S. [E.E.], 1905	*Detroit*
Sydney Rumney Russel, B.S. [M.E.], 1904	*Detroit*
Ralph Russell Tinkham, B.S. [C.E.], 1905	*Ann Arbor*
John Joseph Woolfenden, B.S. [E.E.], 1905	*Detroit*

CANDIDATES FOR AN ADVANCED DEGREE STUDYING IN ABSENTIA

NAME	RESIDENCE
*1887-88.	
William Wallace Campbell, B.S. [C.E.], 1886	*Mt. Hamilton, Cal.*
1892-93.	
William Vaughan Moses, B.S. [M.E.], 1889	*Swampscott, Mass.*
Arthur Douglas Mott, B.S. [C.E.], 1892	*Maywood, Ill.*
1893-94.	
Hadley Baldwin, B.S. [C.E.], 1893	*Matoon, Ill.*
Andrew Renick Benson, B.S. [C.E.], 1890	*Washington, D. C.*
Alfred Stone Calkins, B.S. [C.E.], 1891	*Joliet, Ill.*
Edward Henry Cheney, B.S. [E.E.], 1892	*Chicago, Ill.*
Ernest Ben Conrad, B.S. [M.E.], 1890	*Bayonne, N. J.*
Hugh Flournoy Van Deventer, B.S. [M.E.], 1892	*Rockmart, Ga.*
1894-95.	
Thomas Edson Barnum, B.S. [E.E.], 1892	*Milwaukee, Wis.*
1895-96.	
Charles Augustine Miner, B.S. [C.E.], 1895	*Petersburg, Va.*
1900-01.	
Leonard Frederick Hildner, B.S. [M.E.], 1893	*Allegheny, Pa.*
1901-02.	
George Samuel Hill, B.S. [C.E.], 1901	*Chicago, Ill.*

---

*Date of registration for the advanced degree sought.

1902-03.	
Leslie Douglas Anderson, B.S. [M.E.], 1901	*Val Verde, Ariz.*
Ora Miner Leland, B.S. [C.E.], 1900	*Ithaca, N. Y.*
1903-04.	
Andrew Horace MacDougall, B.S. [M.E.], 1901	*Harvey, Ill.*
Herbert Albion Moody, B.S. [M.E.], 1898	*Richwood, W. Va.*
1904-05.	
Albert John Becker, B.S. [M.E.], 1903	*Grand Forks, N. D.*
Isaac DeYoung, B.S. [C.E.], 1898	*Sault Ste. Marie*
Charles Young Dixon, B.S. [C.E.], 1887	*Amherstburg, Ont.*
†Isaac Channing Goff (1879), [C.E.], 1905	
Arthur Holmes, B.S. [M.E.], 1904	*Syracuse, N. Y.*
Willy Lehnartz, B.S. [M.E.], 1900	*Grand Rapids*
†George D. MacNaughton, B.S. [C.E.], 1901	*New York City, N. Y.*
†Louis Ernest Seas, B.S. [C.E.], 1901	*New York City, N. Y.*
George Daniel Wuerfel, B.S. [M.E.], 1900	*Toledo, O.*
1905-06.	
†Francis Joseph Seabolt, B.S. [M.E.], 1897	*Schenectady, N. Y.*
Sutton Van Pelt, B.S. [C.E.], 1898	*Sault Ste. Marie*

UNDERGRADUATES‡

NAME	COURSE	CREDIT	RESIDENCE
Allison Abbott	C	31	*Geneva, Ill.*
Arthur Alger Abel	M	79	*Ypsilanti*
Louis William Abrons	C	58	*New York, N. Y.*
Ferdinand Wise Adams			*Saginaw*
John Hamilton Alden		12	*Saginaw*
Leon Barton Alexander	C	20	*Penn*
Harley Clifford Alger	M	74	*Hillsdale*
Clarence Schirmer Alig		14	*Indianapolis, Ind.*

---

†Not in Calendar.

‡The letters in the column headed Course indicate the line of work the student has chosen to pursue: C denoting civil engineering; M, mechanical engineering; E, electrical engineering; Ch, chemical engineering; Mar, marine engineering; S, miscellaneous studies not leading to any degree. As students are not asked to make choice of course until the beginning of their second year, the absence of a letter indicates that the student is in his first year. The figures in the column headed Credit indicate the number of hours of work taken by the student prior to the beginning of the current academic year, 1905-1906, and completed without conditions, or credited to him on advanced standing. By an hour of work is meant the equivalent of one exercise a week for one semester. A dagger (†) preceding a student's name signifies that he also pursued studies, for the whole or a part of the year, in some other department of the University, indicated by an italic letter following the name, to-wit: *a*, Department of Literature, Science, and the Arts; *m*, Department of Medicine and Surgery; *l*, Department of Law; *p*, School of Pharmacy; *h*, Homœopathic Medical College; *d*, College of Dental Surgery.

am Chisholm Allan	**M**	99	***Cleveland, O.***
ey Rindge Allen	**M**	100	***Grand Rapids***
am Thomas Alliger	**Ch**	24	***Dowagiac***
tenay Derby Allington	**M**	104	***Saginaw***
e Eugene Allington		12	***Saginaw***
vell Alpern	**M**	104	***Alpena***
r Edwin Anderson	C	24	*Norway*
Malander Anderson	S	106	*Fountain Green, Utah*
r Warner Angstman		4	*Detroit*
ett Frank Annis	C	20	*Denver, Col.*
cis Wirt Appleton	E	31	*Longmont, Col.*
les DeVeny Vincent Armour		8	*Chicago, Ill.*
ield K. Ash	M	78	*Saint Johns*
r George Atkinson			*Detroit*
rt Henry Atkinson	E	70	*Norvell*
ter Ely Atwood	C	45	*Olivet*
s Evans Ayres	C	32	*Detroit*
rd Kennedy Bacon	M	64	*Denver, Col.*
har Lal Badhwar	E	76	*Ferozepose City, Punjab, India*
s Rudolph Bailey	C	103	*Big Rapids*
n Adams Baker	E	112	*Lansing*
Ritter Baker			*Detroit*
Douglas Baker	C	71	*Fairfield*
ld Clark Baldwin	C	12	*Grand Rapids*
in Dana Baldwin	M	32	*Grand Rapids*
er Taylor Ball	Mar	32	*Detroit*
les Nelson Ballentine			*Port Huron*
y Pickands Banks	Ch	68	*Chicago, Ill.*
y Sherman Barfield		8	*Toledo, O.*
ll Barnard	M	109	*Saginaw, West Side*
rt Barnard			*Frederick, S. Dak.*
Lee Barns	E	129	*Petoskey*
Louis Barns	C	36	*Delray*
all Crittenden Barrett		12	*Wooster, O.*
rt Anthony Pelham Barrier			*Detroit*
r Llewellyn Barrows	Ch	24	*Detroit*
am Kenneth Barry	E	80	*Rochester, N. Y.*
ton Fred Bartlett	Ch	54	*Ann Arbor*
y Skinner Bartlett	E	71	*Detroit*
Warren Barton	E	107	*Sturgis*
h L. Barton	C	28	*Detroit*
les Wesley Bartrem	C	32	*Ann Arbor*
wer Weimer Bash	C	20	*Huntington, Ind.*
ard Francis Baxter		8	*Grand Rapids*
am Campbell Baxter		14	*Yale*
n Porter Beach	C	28	*Birmingham*

Walter Cooley Becker	Ch	81	*Chicago, Ill.*
Roy Beechler	M	91	*Ithaca*
Russell Stuart Begg		24	*Columbus Grove, O.*
Clarence Alfred Bell	M	28	*Rochester, N. Y.*
Robert Meredith Bellman	M	95	*Toledo, O.*
Edwin Irving Belote			*Elkhart, Ind.*
Marvin Jacob Beltz	M	32	*Akron, O.*
Carl Michael Bergin	C	35	*Lowell*
Gerrit Bergmans	E	43	*Sneek, Netherlands*
Hymen Manuel Berliant	C	47	*Chicago, Ill.*
Carroll Thayer Berry			*Portland, Me.*
Otto Carter Berry, A.B.	M	148	*Glendale, O.*
Walter Stewart Berry	S	27	*Glendale, O.*
Joshua Alvin Bertsch		4	*Cambridge City, Ind.*
Lawrence Howard Bertsch, A.B., *Indiana University*	M	77	*Cambridge City, Ind.*
Henry Edward Beyster	M	24	*Detroit*
George Crooks Billinger		8	*Allegheny, Pa.*
Glen Robbins Birchard			*West Bay City*
Charles Arthur Bird	E	36	*Saginaw*
Harry Eugene Bird	M	20	*Youngstown, O.*
†Russell Spencer Bishop, *a*			*Flint*
Carl Otto Bjork	C	50	*Chicago, Ill.*
Grover Cleveland Blalock			*Wingo, Ky.*
Samuel Edward Blanchard			*Toledo, O.*
George Joseph Blanton			*Toledo, O.*
Frank Walker Bliss	Ch	50	*Ann Arbor*
Homer Newell Bliss	S	58	*Buffalo, N. Y.*
Frank Blitz	M	31	*Detroit*
Fred Ethelbert Blood			*Honeoye Falls, N. Y.*
Howard Earl Blood		8	*Kalamazoo*
Gustave Robert Bode	C	24	*Iron Mountain*
Guy Willard Bolté			*Lakeside, Ill.*
Frank Leonard Bolton			*Portland, Me.*
Frederick Bernhard Bonde		24	*Valley City, N. Dak.*
Ellis Moss Bonney	Ch	105	*Chicago, Ill.*
Joseph Leroy Bonniger		8	*North East, Pa.*
Daniel Bontecou, Jr.		16	*Kansas City, Mo.*
Roy Edmund Boomer	C	74	*Ann Arbor*
Lloyd Logan Boone	C	36	*Montpelier, O.*
Luke Connable Bootes	C	52	*Jackson*
Robert Lee Boughton	Mar	66	*Battle Creek*
Stanley Ward Boughton	E	32	*Ann Arbor*
Joseph Samuel Bowman			*Las Vegas, New Mex.*
Lawrence Frederick Bowman	C	27	*Duluth, Minn.*
Winfield Sanford Bowman	E	38	*Kansas City, Kan.*
Estes Jackson Boyd		24	*Beaver Falls, Pa.*
Ford E. Boyd	M	36	*Fenton*

Kenneth Morrison Boyd	M	20	*Youngstown, O.*
Merlin Boyd	Ch	75	*Detroit*
Wilber Irving Boyles	M	71	*Charlotte*
Charles Brigham Boynton	C	118	*Muskegon*
Robert Hammond Boynton	C	16	*Batavia, N. Y.*
Samuel Craighead Brandon	M	111	*Detroit*
Benjamin Nathan Braun	M	106	*Ann Arbor*
Carl Wesley Braznell	M	28	*Stockdale, Pa.*
Howard Clay Brenizer	Ch	39	*Akron, O.*
Karl Edgar Brewer		24	*Rochester, N. Y.*
Elmer Stewart Brewster			*Leavenworth, Kan.*
Howard Gilbert Brinton	E	44	*Bradford, Pa.*
John Easton Broadbridge			*Marine City*
Arthur Sayer Brodhead		4	*Buffalo, N. Y.*
Henry Holbert Brodhead	M	59	*Buffalo, N. Y.*
Hugh Brodie	C	76	*Jacksonville, Fla.*
Stuart Benjamin Brodie		12	*North Evans, N. Y.*
Joe Richardson Brooks	C	41	*Menominee*
Norton Townshend Brotherton	M	45	*Detroit*
Grover Cleveland Brown		33	*Rogersville*
Oliver Gilbert Brown	C	66	*Honeoye, N. Y.*
Ralph Edgar Brown		8	*Manistique*
Ralph Leigh Brown			*Pueblo, Col.*
Morley Jesse Brown	Ch	60	*Sterling, Ill.*
Albert Ernest Brugger	Ch	57	*Columbus, Neb.*
William James Bryan	Ch	126	*Cincinnati, O.*
Frank Albert Buchanan, Jr.	E	79	*Newport, Ky.*
Guy Valgean Budlong	E	28	*Sturgis*
Louis Anton Buese	Ch	32	*Republic*
Ralph William Bulkeley		16	*Grand Rapids*
Edward Taylor Bullock			*New York, N. Y.*
William Carr Bulmer		4	*Youngstown, O.*
Albert Comstock Burch	Mar	70	*Grand Rapids*
William Allds Burnham		8	*Houghton*
Robert Archibald Burns	M	40	*Saint Paul, Minn.*
Frank Burton	Ch	68	*Detroit*
Russell Conklin Burton	C	36	*Detroit*
Eli Franklin Bush	E	107	*Hudson*
Frank Jarvis Bush	M	40	*Bay City*
Carl Darwin Bushnell	M	64	*Kalamazoo*
Henry William Buswell		8	*Grand Haven*
Albert Simpson Butler	E	87	*Honesdale, Pa.*
Louis Butler	E	95	*Kendall, Mont.*
Robert Horace Butters	M	28	*Ludington*
Eugene Anthony Buysse			*Detroit*
Royal Sumner Buzzell			*Flint*
Mark Stone Cady	C	16	*Sault Ste. Marie*
Samuel Cline Cady	M	18	*Sault Ste. Marie*

Arthur Blaine Caldwell	C	56	*York, N. Y.*
Herbert Blowers Calkins	E	50	*Wayland*
George Shiras Call	M	31	*Marquette*
George Stevenson Callahan		27	*Cincinnati, O.*
Ernest Wright Camp			*Saginaw, West Side*
Harvey Blaine Campbell	M	71	*Battle Creek*
Herbert Vincent Campbell			*Ann Arbor*
John David Campbell	M	32	*Royal Oak*
John Wood Campbell	E	101	*Napoleon, O.*
Robert Thomson Campbell			*Grand Rapids*
De Forest Wheaton Candler		4	*Detroit*
Clifton O'Neal Carey, B.S., *Haverford College*	C	42	*Wilmington, O.*
Irving James Carmichael			*Calumet*
Dewey L. Carpenter	M	23	*Orion*
Howard Bruce Carpenter	S	23	*Pittsburg, Pa.*
Howard Wiltse Carpenter			*Big Rapids*
Augustus Carrier, Ph.G., *Detroit College of Pharmacy*	E	98	*Ann Arbor*
Ralph Valentine Carrier	E	28	*Three Oaks*
Howard Carroll		4	*Toledo, O.*
John Michael Carroll	M	23	*Avon, N. Y.*
William F. Carroll	C	47	*Chicago, Ill.*
Edgar McMurray Carrothers	M	84	*Dewey, Ind. T.*
George Miller Carter	M	70	*Jackson*
Addison Reading Cary	E	40	*Detroit*
William Mallory Casey		4	*Cedar Falls, Ia.*
Roger Stevens Cathcart	M	70	*Bay City*
Reed John Caughey	M	32	*Erie, Pa.*
Clarence William Chaddock		8	*Benton Harbor*
Albert Rodney Chandler	E	48	*Salem, Mass.*
Max Chandler	E	24	*Jerome*
Rex Chandler	E	24	*Jerome*
Henry Morrison Chapin	S	69	*Ashtabula, O.*
Walter Charles	E	28	*Detroit*
Charles Timothy Chenevert	M	49	*Defiance, O.*
*Arthur Christensen	E	24	*Greenville*
Theodore Ecker Christian		8	*Lakewood, O.*
Henry Austin Christie			*Ann Arbor*
Ralph Lorenzo Chubb			*Ann Arbor*
Claude J. Clark	E	66	*Pottsdam, N. Y.*
Edward Samuel Clark	M	40	*West Brattleboro*, Vt
George Winfred Clark	E	117	*Grand Rapids*
John Foster Clark		8	*Caro*
Nelson John Clark			*Detroit*
Roy Clark	M	30	*Youngstown, O.*
William Dennison Clark	M	72	*Detroit*

---

*Deceased.

In Shop Practice:—Course 1.
In Surveying:—Course 4.
In Civil Engineering:—Course 11.
In Mechanical Engineering:—Courses 1, 3, 4.
In Electrical Engineering:—Course 1.

In Elective Studies, taken in the Department of Engineering, r in the Department of Literature, Science, and the Arts:—an nount sufficient to secure in all *one hundred and forty hours of edit.*

In Marine Engineering

169. To obtain the recommendation of the Faculty for the de- ee of Bachelor of Science in Marine Engineering, the student must tisfactorily complete courses as follows:

In English:—Course 1.

In German, French, and Spanish:—Sixteen hours, to be elected explained in note at bottom of pages 72, 73.
In Mathematics:—Courses 1, 2, 3, 4, 5, 6.
In Physics:—Courses 1E, 2E, 3*c*.
In Chemistry:—Courses 2E, 3*a*.
In Metallurgy:—Course 1.
In Drawing:—Course 4.
In Shop Practice:—Course 1.
In Surveying:—Course 4.
In Civil Engineering:—Courses 1, 5.
In Mechanical Engineering:—Courses 1, 3, 4, 5, 6, 7.
In Electrical Engineering:—Course 1.
In Naval Architecture and Marine Engineering:—Courses 1, 2, 4, 5, 6, 7, 8, 9, 10, 11.

In Elective Studies, taken in the Department of Engineering, r in the Department of Literature, Science, and the Arts:—an nount sufficient to secure in all *one hundred and forty hours of edit.*

Or the student may take the civil, mechanical, or electrical urse for three years and do the work stated in § 158 for the fourth ar.

In Architecture

170. To obtain the recommendation of the Faculty for the de- ree of Bachelor of Science in Architecture, the student must satis- ctorily complete the courses given below. These requirements are bject to such modification as may be found necessary.

In Greek:—Course 8.
In Latin:—Course 10.
In English:—Course 1.

In German, French, and Spanish :—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.

In Philosophy :—Courses 2, 6.

In Political Economy :—Course 41.

In Mathematics :—Courses 1, 2, 3, 4.

In Physics :—Courses 1, 2.

In Chemistry :—Course 2E.

In Geology :—Course 6.

In Drawing :—Courses 4, 5, 21, 22, 23, 24.

In Shop Practice :—Course 1.

In Civil Engineering :—Course 11.

In Mechanical Engineering :—Course 13.

In Architecture :—Courses 1, 2, 4, 5, 6, 7, 8, 11, 12, 13, 14, 17. 18, 19, 21, 22, 23, 24.

In Elective Studies, taken in the Department of Engineering. or in the Department of Literature, Science, and the Arts :—an amount sufficient to secure in all *one hundred and forty hours of credit.*

In Architectural Engineering

171 To obtain the recommendation of the Faculty for the degree of Bachelor of Science in Architectural Engineering, the student must satisfactorily complete the courses given below. These requirements are subject to such modifications as may be found necessary.

In Greek :—Course 8.

In Latin :—Course 10.

In English :—Course 1.

In German, French, and Spanish :—Sixteen hours, to be elected as explained in note at bottom of pages 72, 73.

In Political Economy :—Course 41.

In Mathematics :—Courses 1, 2, 3, 4, 5.

In Physics :—Courses 1E, 2E, 3c.

In Chemistry :—Course 2E.

In Geology :—Course 6.

In Drawing :—Courses 4, 5, 21, 25.

In Shop Practice :—Course 1.

In Civil Engineering :—Courses 1, 2, 3, 4, 9.

In Mechanical Engineering :—Courses 3, 13.

In Electrical Engineering :—Course 1.

In Architecture :—Courses 1, 2, 4, 5, 9, 10, 11, 12, 13, 14, 21, 22. 24.

In Elective Studies, taken in the Department of Engineering. or in the Department of Literature, Science, and the Arts :—an amount sufficient to secure in all *one hundred and forty hours of credit.*

GRADUATE COURSES

The Degree of Master of Science

172. A candidate for the degree of Master of Science in Engineering or in Architecture must have previously received the corresponding degree of Bachelor of Science from this Department, or, if graduated elsewhere, must satisfy the Faculty that he possesses equivalent attainments.

He must pursue, for at least one year, in residence at the University, advanced work upon a selected Major Subject and shall present a satisfactory thesis which must be a contribution to Engineering, or equivalent to at least twenty hours of work. In addition he shall select from approved minor subjects and carry on an amount of work equivalent to at least fifteen hours.

All work for this degree will be under the direction of a Committee, of which the Professor in charge of the Major shall be Chairman, and the Committee will be composed of the members of the Faculty under whom the several subjects are taken up, and the candidate will be required to pass before the Committee an examination covering Major, Minors, and Thesis, previous to recommendation for the degree. Fee, see § 12.

The Degrees of Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Naval Architect, Marine Engineer, Architect, and Architectural Engineer.

173. These advanced degrees will be conferred only upon persons who have proved their ability to plan and direct professional work or original investigation in applied science.

A candidate for any of these degrees must have received a Bachelor's or an equivalent degree from an approved College, at least five years before registration for the advanced degree. He must have been engaged in professional work, in responsible charge of the same for at least one year, and must present at the time of registration a detailed account of his professional experience to that time, which must be approved by the heads of the departments of Engineering.

He must have pursued before receiving the degree an amount of advanced study equivalent to at least one year's work at the University, which work must have been performed under the direction of the above committee of the Faculty, or be approved by them.

Those who have received the degree of Master of Science from this Department may be excused from part of the advanced study required, in case the work done for the master's degree is, in the opinion of the committee, acceptable towards the higher degree.

He must in addition to this present a satisfactory thesis giving evidence of his professional attainments and his fitness to receive the degree sought. Fee, see § 12.

SCHEDULE OF EXAMINATIONS

In 1906-1907 the Examination Periods begin as follows: First Semester, Friday, Feb. 1; Second Semester, Friday, June 7.

Time of Exercise*	Monday 8	Monday 9	Monday 10	Monday 11	Monday 1	Monday 2	Monday 3
Time of Examination	Monday 8-10	Tuesday 8-10	Thursday 8-10	Friday 8-10	Thursday 4-6	Tuesday 2-4	Wednesday 2-4
Time of Exercise	Tuesday 8	Tuesday 9	Tuesday 10	Tuesday 11	Tuesday 1	Tuesday 2	Tuesday 3
Time of Examination	Saturday 8-10	Wednesday 8-10	Monday 2-4	Thursday 2-4	Friday 4-6	Saturday 4-6	Friday 2-4
Time of Exercise	Wednesday 8	Wednesday 9	Wednesday 10	Wednesday 11	Wednesday 1	Wednesday 2	Wednesday 3
Time of Examination	Saturday 10-12	Monday 10-12	Friday 10-12	Wednesday 10-12	Monday 4-6	Tuesday 10-12	Thursday 10-12

* NOTE: By the **Time of Exercise** is meant the time of the first exercise of the week in any given course. For example: If a course is given Monday at 3, Wednesday at 3, and Friday at 10, it is said to be given **Monday at 3.** By referring to Monday 3, in the schedule, it will be seen that the examination falls upon Wednesday, 2-4. Examinations in shop work are held Saturday 2-4, Tuesday 4-6 and Wednesday 4-6. For further information concerning shop examinations consult the Superintendent of shops.

175. REGISTER OF STUDENTS FOR THE YEAR 1905-6

RESIDENT GRADUATES

NAME	RESIDENCE
Joel Martin Barnes, B.S. [Ch.E.], 1905, *Holder of Michigan Gas Association Fellowship*	*Quincy*
Alexander MacDonald Graver, B.S. [M.E], 1905	*Chicago, Ill.*
Ambrose Pond Merrill, B.S. [C.E.], 1904, *University of Utah*	*Richmond, Utah*
Horace Winchester Miller, Jr., B.S. [Mar.E], 1905	*Traverse City*
Ralzemond Drake Parker, B.S. [E.E.], 1905	*Detroit*
Sydney Rumney Russel, B.S. [M.E.], 1904	*Detroit*
Ralph Russell Tinkham, B.S. [C.E.], 1905	*Ann Arbor*
John Joseph Woolfenden, B.S. [E.E.], 1905	*Detroit*

CANDIDATES FOR AN ADVANCED DEGREE STUDYING IN ABSENTIA

NAME	RESIDENCE
*1887-88.	
William Wallace Campbell, B.S. [C.E.], 1886	*Mt. Hamilton, Cal.*
1892-93.	
William Vaughan Moses, B.S. [M.E.], 1889	*Swampscott, Mass.*
Arthur Douglas Mott, B.S. [C.E.], 1892	*Maywood, Ill.*
1893-94.	
Hadley Baldwin, B.S. [C.E.], 1893	*Matoon, Ill.*
Andrew Renick Benson, B.S. [C.E.], 1890	*Washington, D. C.*
Alfred Stone Calkins, B.S. [C.E.], 1891	*Joliet, Ill.*
Edward Henry Cheney, B.S. [E.E.], 1892	*Chicago, Ill.*
Ernest Ben Conrad, B.S. [M.E.], 1890	*Bayonne, N. J.*
Hugh Flournoy Van Deventer, B.S. [M.E.], 1892	*Rockmart, Ga.*
1894-95.	
Thomas Edson Barnum, B.S. [E.E.], 1892	*Milwaukee, Wis.*
1895-96.	
Charles Augustine Miner, B.S. [C.E.], 1895	*Petersburg, Va.*
1900-01.	
Leonard Frederick Hildner, B.S. [M.E.], 1893	*Allegheny, Pa.*
1901-02.	
George Samuel Hill, B.S. [C.E.], 1901	*Chicago, Ill.*

---

*Date of registration for the advanced degree sought.

1902-03.	
Leslie Douglas Anderson, B.S. [M.E.], 1901	*Val Verde, Ariz.*
Ora Miner Leland, B.S. [C.E.], 1900	*Ithaca, N. Y.*
1903-04.	
Andrew Horace MacDougall, B.S. [M.E.], 1901	*Harvey, Ill.*
Herbert Albion Moody, B.S. [M.E.], 1898	*Richwood, W. Va.*
1904-05.	
Albert John Becker, B.S. [M.E.], 1903	*Grand Forks, N. D.*
Isaac DeYoung, B.S. [C.E.], 1898	*Sault Ste. Marie*
Charles Young Dixon, B.S. [C.E.], 1887	*Amherstburg, Ont.*
†Isaac Channing Goff (1879), [C.E.], 1905	
Arthur Holmes, B.S. [M.E.], 1904	*Syracuse, N. Y.*
Willy Lehnartz, B.S. [M.E.], 1900	*Grand Rapids*
†George D. MacNaughton, B.S. [C.E.], 1901	*New York City, N. Y.*
†Louis Ernest Seas, B.S. [C.E.], 1901	*New York City, N. Y.*
George Daniel Wuerfel, B.S. [M.E.], 1900	*Toledo, O.*
1905-06.	
†Francis Joseph Seabolt, B.S. [M.E.], 1897	*Schenectady, N. Y.*
Sutton Van Pelt, B.S. [C.E.], 1898	*Sault Ste. Marie*

UNDERGRADUATES‡

NAME	COURSE	CREDIT	RESIDENCE
Allison Abbott	C	31	*Geneva, Ill.*
Arthur Alger Abel	M	79	*Ypsilanti*
Louis William Abrons	C	58	*New York, N. Y.*
Ferdinand Wise Adams			*Saginaw*
John Hamilton Alden		12	*Saginaw*
Leon Barton Alexander	C	20	*Penn*
Harley Clifford Alger	M	74	*Hillsdale*
Clarence Schirmer Alig		14	*Indianapolis, Ind.*

---

†Not in Calendar.

‡The letters in the column headed Course indicate the line of work the student has chosen to pursue: C denoting civil engineering; M, mechanical engineering; E, electrical engineering; Ch, chemical engineering; Mar, marine engineering; S, miscellaneous studies not leading to any degree. As students are not asked to make choice of course until the beginning of their second year, the absence of a letter indicates that the student is in his first year. The figures in the column headed Credit indicate the number of hours of work taken by the student prior to the beginning of the current academic year, 1905-1906, and completed without conditions, or credited to him on advanced standing. By an hour of work is meant the equivalent of one exercise a week for one semester. A dagger (†) preceding a student's name signifies that he also pursued studies, for the whole or a part of the year, in some other department of the University, indicated by an italic letter following the name, to-wit: *a*, Department of Literature, Science, and the Arts; *m*, Department of Medicine and Surgery; *l*, Department of Law; *p*, School of Pharmacy; *h*, Homœopathic Medical College; *d*, College of Dental Surgery.

m Chisholm Allan	M	99	*Cleveland, O.*
y Rindge Allen	M	100	*Grand Rapids*
m Thomas Alliger	Ch	24	*Dowagiac*
enay Derby Allington	M	104	*Saginaw*
Eugene Allington		12	*Saginaw*
ell Alpern	M	104	*Alpena*
r Edwin Anderson	C	24	*Norway*
Malander Anderson	S	106	*Fountain Green, Utah*
Warner Angstman		4	*Detroit*
tt Frank Annis	C	20	*Denver, Col.*
is Wirt Appleton	E	31	*Longmont, Col.*
es DeVeny Vincent Armour		8	*Chicago, Ill.*
eld K. Ash	M	78	*Saint Johns*
r George Atkinson			*Detroit*
t Henry Atkinson	E	70	*Norvell*
er Ely Atwood	C	45	*Olivet*
Evans Ayres	C	32	*Detroit*
rd Kennedy Bacon	M	64	*Denver, Col.*
har Lal Badhwar	E	76	*Ferozepose City, Punjab, India*
Rudolph Bailey	C	103	*Big Rapids*
n Adams Baker	E	112	*Lansing*
Ritter Baker			*Detroit*
ouglas Baker	C	71	*Fairfield*
d Clark Baldwin	C	12	*Grand Rapids*
n Dana Baldwin	M	32	*Grand Rapids*
r Taylor Ball	Mar	32	*Detroit*
es Nelson Ballentine			*Port Huron*
Pickands Banks	Ch	68	*Chicago, Ill.*
Sherman Barfield		8	*Toledo, O.*
l Barnard	M	109	*Saginaw, West Side*
t Barnard			*Frederick, S. Dak.*
Lee Barns	E	129	*Petoskey*
ouis Barns	C	36	*Delray*
ll Crittenden Barrett		12	*Wooster, O.*
t Anthony Pelham Barrier			*Detroit*
Llewellyn Barrows	Ch	24	*Detroit*
m Kenneth Barry	E	80	*Rochester, N. Y.*
on Fred Bartlett	Ch	54	*Ann Arbor*
Skinner Bartlett	E	71	*Detroit*
Warren Barton	E	107	*Sturgis*
L. Barton	C	28	*Detroit*
es Wesley Bartrem	C	32	*Ann Arbor*
ver Weimer Bash	C	20	*Huntington, Ind.*
rd Francis Baxter		8	*Grand Rapids*
m Campbell Baxter		14	*Yale*
Porter Beach	C	28	*Birmingham*

Harold Clinton Jones	Ch	70	*Quincy*
Russell Gwilym Jones	E	79	*Van Wert, O.*
C. Harris Judd		4	*Attica*
Lincoln Thaddeus Judd		8	*Detroit*
Milo Oliver Judd	E	69	*Ann Arbor*
Frederick Charles Kahle, Jr.	E	109	*Menominee*
George Arthur Kahn	C	32	*Detroit*
Leopold Joseph Katziantschitsch		8	*Bay City*
George Irving Keal	M	115	*Dexter*
James Edward Keegan			*Grand Rapids*
Ralph Whittlesey Keeler	M	50	*Detroit*
James Trafton Keena			*Detroit*
Mylne Maurice Keena			*Detroit*
Russel George Kelley	M	'32	*Detroit*
Charles Dane Kelly	M	102	*Mount Clemens*
Harry Conner Kelly		8	*Mount Clemens*
Joseph Edward Kelly		4	*Lowell*
Walter Frank Kelsey		4	*East Aurora, N.*
Andrew Judson Kempton	C	32	*Barre, Vt.*
Warren Francis Kendrick	M	108	*Ann Arbor*
Clifford Stewart Kennedy	E	105	*Niles*
George Eaton Kephart	C	46	*Berrien Springs*
William Robertson Kepler		18	*North Girard, Pa.*
Walter Brown Kern	M	42	*Dayton, O.*
Thomas Sylvester Keveney	E	53	*New York, N. Y*
Walter Cole Keys	E	70	*Glendale, O.*
Lloyd Ray Kimmel	E	41	*Ypsilanti*
Horace Burbank Kimmey			*Whitehall*
Clyde Arthur Kindig	M	62	*Akron, O.*
Justin Thomas Kingdon	C	115	*Ann Arbor*
Howard Kipp	C	60	*Greenville*
Arthur Collins Kirby	C	24	*New Bedford,*
John Christian Klag			*Toledo, O.*
William Henry Klein	Ch	105	*Kansas City,*
William Edmund Kleiner	M	44	*Detroit*
Harmon J. Kline		12	*Alpena*
Paul Edwin Knapp		4	*Coleman*
Frederick Evoy Kneip	C	106	*Ypsilanti*
Alvin Bruce Knight		8	*Pontiac*
William Clark Knight	Mar	91	*Westboro,*
Clarence Carl Knipmeyer	E	76	*Higginsville*
Edward Moore Knox	C	74	*Ann Arbor*
George Henry Knutson	C	42	*Muskegon*
James Henry Koehler			*Saginaw*
William Edward Kohler			*Toledo, O*
Marion Den Herder Kolyn			*Grand Ra*
Milton Harris Kramer	Ch	80	*Cadillac*
Victor William Krause			*Grand R*

Clarence Henry Kremers	**M**	112	***Holland***
August William Kretzshmar	**Mar**	36	***Detroit***
***Gerald Ezra Krupp**		14	***Saginaw***
George Hans Kuhn	C	74	*Chicago, Ill.*
Homer John Kunz		4	*Toledo, O.*
Armen Stephen Kurkjian	M	32	*Grand Rapids*
Alvis Kusic	E	12	*Iroquois, N. Y.*
Arthur Henry August Kutsche		16	*Mount Clemens*
Rudolph Paul Kutsche	E	36	*Grand Rapids*
Merle J. La Croix			*Lima, O.*
Albee Lovejoy Ladd	E	41	*Osceola, Wis.*
Lewis West Lamb	E	72	*Greenville*
Walter Eugene Lambert			*Ann Arbor*
George William Lamke	E	111	*Detroit*
Wilfred Elliott Lamm	E	62	*Danville, Ill.*
Walter Henry Lane	C	64	*Friendship, N. Y.*
William Raymond Lane			*Detroit*
Leon Karl Laney	S	50	*Lima, O.*
Ernst Frederick Lang	C	40	*Detroit*
Joseph Kerr Langfitt	M	72	*Allegheny, Pa.*
Samuel Pierpont Langley	M	67	*Ann Arbor*
Jesse Raymond Langley	E	28	*Alva, Okla.*
Hector George Lareau		29	*Detroit*
Henry Larsen	M	116	*Eastlake*
Frank Woodin Lathrop			*Birmingham, Ala.*
Percy Mapes Lau	C	24	*Detroit*
Elmer Claude Lawton	M	70	*Lawtons, N. Y.*
Glenn Joshua Leach		4	*Ann Arbor*
Ira Henry Lecklider, Jr.			*Toledo, O.*
Arthur White Leet	E	36	*Fredonia, N. Y.*
Arthur Edward Legg	Ch	71	*Coldwater*
Paul Leidy			*Toledo, O.*
J. P. Leland	C	32	*Hart*
Andrew Lenderink	M	61	*Kalamazoo*
Harry Harrison Levene	Mar	37	*Detroit*
Arthur Ramsdell Lewis			*Bay City*
George Eveline Lewis	E	44	*Ypsilanti*
Washington Bart Lewis	C	73	*Marquette*
Charles Coe L'Hommedieu	M	40	*Detroit*
George W. Cass Lightner	E	40	*Detroit*
Charles Ellis Lilley	E	28	*California, Pa.*
Clinton Donald Lindsey		8	*Johnstown, Pa.*
Arthur Frank Liska			*Detroit*
James John Livingstone		4	*Menominee*
Don Willett Lobdell			*Flat Rock*
Calvin Arthur Lohmiller	C	76	*Ann Arbor*
Charles Arthur Longstreet		4	*Youngstown, O.*

---

*Deceased.

Walter Thomas Loomis			*Omaha, Neb.*
Marcus Thompson Lothrop	Ch	115	*Buffalo, N. Y.*
Merrill Rowe Lott	E	32	*Elk Rapids*
John Edward Loughrey	E	20	*Waterport, N. Y.*
Hansell William Loveland			*McDonald, Pa.*
Alfred Henry Lovell			*Niagara Falls, Ont.*
Everett John Lovett	M	104	*Chicago, Ill.*
Dwight Everard Lowell	M	110	*Auburn, Me.*
Carl Earl Loyster		4	*Hudson*
John Paul Lucas	E	81	*Ontario, Cal.*
Howard Ivan Ludwig		16	*Ann Arbor*
†Roy Vincent Lull, *a*		4	*Ithaca, N. Y.*
Hugh John Lumsden	C	110	*Ann Arbor*
Edgar Lussky	E	81	*Chicago, Ill.*
Harry Milton Luttenton	C	71	*Jackson*
Frank Cegarra Luza	E	29	*Iquique, Chili, South America*
James Duncan Knapp Lyman, A. B.	C	152	*Norwalk, O.*
Malcolm Patrick Lyon	E	32	*Sault Ste. Marie*
Daniel Handley McAllister	M	32	*Salt Lake City, Utah*
Reubin McArthur	C	36	*Lapeer*
Bert Gordon McCarthy			*Kingsley*
John Alexander McCarthy	Mar	59	*Kingsley*
Harry England McCool		4	*Leavenworth, Kan.*
Daniel James McCormack	M	52	*Ann Arbor*
William Nelson McCoy	Ch	59	*Roseville, O.*
Charles Ewing McCrath	C	32	*Grand Rapids*
Joseph Newton McCreary	C	16	*Toledo, O.*
Edward Joseph McDonnell	M	97	*Port Huron*
William McDowell		8	*Niagara Falls, N. Y.*
Robert Bruce McFarlan	C	54	*Flint*
Malcolm MacHarg		12	*Chicago, Ill.*
James Albert McIntosh			*Detroit*
Fred Washington McKenzie		8	*Alpena*
John Francis MacKey	C	29	*Newberry*
Irwin Bruce McKinney		4	*Holly*
†Henry Westerman McKisson, *l*	M	28	*Toledo, O.*
Norris Raymond Macklem	C	101	*Marlette*
Archibald McLachlan		23	*Port Huron*
Milber Marshall MacLean		16	*Arlington, Mass.*
Angus Roderick McLeod			*Butte, Mont.*
Fred James McNamara			*Howell*
Loren Wallace McOmber	E	70	*Ann Arbor*
David Mac Ritchie	E	73	*Hillsdale*
Andrew Hovgard Madsen	E	28	*Ann Arbor*
Birche Oliver Mahaffey	C	108	*Sulphur Springs, Tex.*
Ralph Elbert Mahaney		8	*Owosso*

Roy Alexander Malcolm	C	56	*Chicago, Ill.*
Arthur John Malcomson		8	*Detroit*
Clarence Oscar Malmberg	E	50	*Austin, Minn.*
Clement Paul Malona	M	70	*Kennedy, N. Y.*
John Lee Manby	C	32	*Battle Creek*
John Markham Manthei		2	*Marquette*
Stuart Fred Marker			*Detroit*
James Harmon Marks	M	36	*Grand Rapids*
Benjamin Raymond Marsh	E	36	*Owosso*
Frank Lee Marsh, Ph.B., *Alma College*	E		*Grand Rapids*
Frank Willard Martin			*Harvey, Ill.*
John Albert Martin	M	28	*Ypsilanti*
William Orrin Mason		12	*Warren, Pa.*
Charles Skinner Matthews		8	*Walled Lake*
Edwin Robert Maurer			*Saint Louis*
Robert Clyde Maxwell	C	94	*Worthington, Pa.*
Richard Bascom May			*Ann Arbor*
Harold LeRoy Mead			*Escanaba*
Julian Curtis Mead			*Detroit*
Robert Beath Mead			*Escanaba*
Ory Glenn Meek			*Morgan*
George August Meier	E	63	*Whittaker*
Frederick William Henry Meiser	C	32	*Detroit*
Solomon Hyman Meister	M	36	*Detroit*
Carl Edward Mensing	M	95	*Chelsea*
Harvey Milton Merker		8	*Detroit*
Haines Rennyson Merritt			*East Aurora, N. Y.*
John Leonard Mess	Ch	69	*Benton Harbor*
Arthur Alexander Meyer	E	76	Detroit
John Louis Meyfarth	Ch	91	*Jackson*
Perry Kay Miller	C	68	*Salamanca, N. Y.*
Ray Andrew Miller		4	*Clarence, N. Y.*
Raymond Edwin Miller	E	104	*Ypsilanti*
Thomas Harold Miller, B.S., *Washington and Jefferson College*	C	94	*Ingram, Pa.*
Carl Glover Milligan	E	22	*Bradford, Pa.*
Adelbert Philo Mills	C	104	*Tecumseh*
Byron Eldred Mills	C	31	*Detroit*
Francis Charlton Mills, Jr.		8	*Cleveland, O.*
Oscar Leroy Mills	C	37	*Joliet, Ill.*
Courtney Newell Mitchell	M	32	*Ann Arbor*
Herbert Cossitt Mitchell		4	*La Grange, Ill.*
Peter Theron Mitchell	E	24	*Charlotte*
Arthur Bernard Modine	M	58	*Chicago, Ill.*
Paul Raymond Moffett			*Williamsport, Pa.*

James H. Molloy, Jr.			*Ishpeming*
Robert Ellsworth Monagle	C	85	*Stanley, N. Y.*
Francis Alexander Montrose	E	69	*Alpena*
†Frank Ludwig Moore, *h*			*Fremont, O.*
James Alfred Moore	C	40	*Traverse City*
Lucian Selwyn Moore, Jr.	M	22	*Detroit*
Stephen Pierson Moore			*Detroit*
William Van Husan Moore	M	16	*Detroit*
Cassius Arden Morford	E	110	*Climax*
George Herbert Morgan	Ch	32	*Youngstown, O.*
George Solomon Morgan		16	*Toledo, O.*
Stuart Gaylord Morley	M	114	*Saginaw*
Christopher George Morrison	C	32	*Wayne*
†George Randolph Morrison, *a*	C	50	*Oak Park, Ill.*
Chester Mott		8	*Metamora*
James Joseph Murphy	C	64	*Detroit*
Ralph Murphy	M	40	*Bangor*
Walter Austin Murphy	Ch	38	*Chicago, Ill.*
John Russell Murray	M	19	*Owosso*
John Sutherland Murray	E	36	*Detroit*
Victor Eugene Murray			*Cincinnati, O.*
Harry Albert Musham	Mar	28	*Chicago, Ill.*
Noah Brooks Myers	E	104	*Ingalls, Ind.*
Bernard Nagelvoort	M	103	*Ann Arbor*
John Nils Nagle	C	68	*Washington, D. C.*
Forrest Nagler	M	112	*Middleville*
John Hunter Nead		4	*Kansas City, Mo.*
Adrian John Neerken	M	135	*Holland*
Levi Heinrich Neilson	C	76	*Greenville*
Walter Neilson		17	*Chicago, Ill.*
Alvin Holthe Nelson	M	82	*Muskegon*
John Martin Nester	C	106	*Lake Linden*
Raymond Fleming Nichols	C	50	*Spencerport, N. Y.*
Earl Michael Nisen	C	78	*Union Grove, Wis.*
Carl Christian Nissler	C	45	*Butte, Mont.*
Fred Stephenson Norcross, Jr.	M	110	*Menominee*
William Howard Norrington		8	*Bay City*
John Fulton Norris	M	51	*Anna, Ill.*
Robert DeWitt Norris	M	55	*Troy, O.*
Carl Uno North	M	60	*West Bay City*
Wendell Phillip Norton, Jr.		9	*Torrington, Conn.*
Norman Sobieski Nye		8	*Montville, O.*
Archie Oakes	M	45	*Grand Haven*
Falconer O'Brien	M	101	*Detroit*
Joseph Alexander O'Brien, A.M., *Niagara University*	C	72	*Medina, N. Y.*
Joseph Parnall O'Brien		6	*Grand Haven*
James Matthew O'Dea			*Pontiac*

William Wallace Odell	Ch	46	*Chicago, Ill.*
Herman John Oldach	Ch	57	*North East, Pa.*
Wallace Nehemiah Osburn	M	69	*Detroit*
Earl William Osgerby		8	*Howell*
Edward Ottomann, Jr.	C	71	*South Haven*
Frank Silas Packard		8	*Sturgis*
Harry Charles Padberg	E	44	*Detroit*
Clifford Alson Paige	C	32	*Grand Rapids*
Felipe Gomez Palacio, B.S., *St. Louis College*	C	53	*Durango, Mex.*
Henry James Palmer	C	65	*Greenville*
Percy Austin Palmer	C	111	*Geneva, N. Y.*
Roy Dalliba Palmer	M	68	*Smith's Creek*
Ralph Hildreth Pardee			*Pontiac*
Frederick Edwin Park	Ch	120	*Adrian*
Alvah Charles Parker		8	*Lansing*
George Andrew Parker, B.S., *Michigan Agricultural College*	E	81	*Ann Arbor*
Burritt Alton Parks	M	43	*Detroit*
Frank Avery Parks		8	*Youngstown, O.*
Lyle George Parrott	C	32	*Mount Clemens*
James William Parry	E	71	*Ann Arbor*
Clarence Elmar Partch			*Des Moines, Ia.*
John Francis Pascoe	C	36	*Republic*
Arthur Gray Pashby	E	98	*Constantine*
Charles Lawson Patterson	E	40	*Pueblo, Col.*
Frank Patterson	Ch	24	*Saginaw*
William Henderson Patterson, B.S., *Geneva College*	C	35	*Beaver Falls, Pa.*
Harry Lanphier Patton	M	72	*Springfield, Ill.*
Carl Erik Paulson	C	35	*Omaha, Neb.*
Stanley Walter Payne	M	28	*Detroit*
William Arséne Payne		8	*Akron, O.*
Thomas Arthur Pearson		8	*Leavenworth, Kan.*
Edward Graeme Peattie	C	54	*Chicago, Ill.*
Fred Pardington Peel			*Ann Arbor*
Chester A. Perkins	M	77	*South Bend, Ind.*
Harry Richardson Perkins		8	*Cuylerville, N. Y.*
Louis MacKenzie Perrin	E	73	*Detroit*
Don Stuart Perry	E	20	*Fayette, O.*
Harry Frederick Petersmeyer	E	54	*Cherokee, Ia.*
George Andrews Peterson			*Detroit*
Walter Carl Peterson	M	36	*Muskegon*
John Halmer Pettitt	C	24	*Bensonia*
Edward Payne Phelps			*Niles*
Leon Harvey Phelps		8	*Indian Falls, N. Y.*
Benjamin Simpson Philbrick			*Friendship, N. Y.*

James Harvey Phinney	C	66	*Detroit*
Edwin Sibley Pierce		16	*Kansas City, Mo.*
Claude Owen Pinch	E	118	*Battle Creek*
Walter Frederick Plett		8	*Cadillac*
Roy Alfred Plumb	Ch	110	*Fenton*
Walt Alfred Plumb		8	*Holly*
Floyd Simpson Poe	E	36	*Iron Mountain*
William Henry Pollard		12	*Seneca Falls, N. Y.*
George Stanley Porter	M	74	*Jackson*
John Jamison Porter		6	*East Jordan*
Ralph Waldo Porter	C	38	*Galesburg, Ill.*
Hoyt Post, Jr.	C	20	*Detroit*
Rossiter Raymond Potter	M	73	*Kalamazoo*
Clyde Volney Powers	C	35	*Montpelier, O.*
Whitney Matthews Prall	Mar	114	*Pontiac*
Joseph Major Pratt	M	108	*La Grange, Ill.*
Walter Mitchell Pratt	C	26	*Detroit*
John Davidson Price	C	70	*Detroit*
Gustav Edward Priess	E	41	*Saginaw*
Francis Courtney Gale Pryor			*Houghton*
Howes James Quale	Ch	50	*Silver Creek, N. Y.*
Maurice James Quinn			*Saginaw*
Edgar Raish			*Marquette*
Claude Norris Rakestraw	E	40	*Toledo, O.*
Horace Patton Ramey	C	105	*Carlisle, Ky.*
John Roy Ramsey	E	28	*Youngstown, O.*
Emmons Blaine Randall		8	*West Bay City*
Christian Rasmussen	Mar	38	*Muskegon*
George Alexander Ray	C	64	*Detroit*
Clarence Melvin Raymond		16	*Jackson*
Forrest Clyde Reed	M	40	*Empire*
Ralph John Reed, B.L., *Pomona College*		61	*Whittier, Cal.*
Russell Shattuck Reed	C	113	*Chicago, Ill.*
William Henry Rees		28	*Scranton, Pa.*
Louis John Rehberg	M	32	*Ann Arbor*
Lon Grenard Reid	E	87	*Akron, O.*
Russell James Reid	C	20	*Battle Creek*
Fred Reiff		8	*Owosso*
Foster Rood Renwick			*Grand Rapids*
Dee Allen Reynders			*Ann Arbor*
Henry Fish Reynick	C	28	*Saginaw*
Robert Albert Reynolds	E	65	*Detroit*
Walter Kremer Rhodes, Ph.B., *Bucknell University*	E	64	*Emmitsburg, Md.*
Wilder Meloy Rich	C	73	*Grand Rapids*
Karl Greene Richards		4	*Buffalo, N. Y.*
Edwin Archibald Ridell	Ch	36	*Youngstown, O.*

Herman Riecks	M	74	*Alpena*
Spencer Ripley	C	110	*Galveston, Tex.*
Louis Ritter	C	36	*Bay City*
Willard Robb	E	36	*Adrian*
Ewell Roberts		8	*Three Rivers*
Thomas Roberts			*Highland, O.*
dney Roberts	C	113	*Grant*
s Adolph Robertson, *a*	Ch	81	*Muscatine, Ia.*
Nichol Robertson		8	*Grand Haven*
Alexander Robertson	C	59	*Escanaba*
James Robinson	C	79	*Fredonia, N. Y.*
Hiram Robinson			*Coldwater*
arl Rohde		8	*Saginaw*
Roy Rook		17	*Bowen, Ill.*
Scott Rosenthal		8	*Toledo, O.*
Wade Ross	C	99	*Fostoria, O.*
t Burton Ross	C	42	*Detroit*
Burton Rouse	M	75	*Bay City*
in Sigurd Rovelstad			*Elgin, Ill.*
Arthur Rowe	Mar	30	*Battle Creek*
Thompson Rowell		20	*Louisville, Ky.*
Curtis Roys			*Grand Rapids*
ce Roys	M	120	*Saginaw*
Pittman Rumney	M	79	*Detroit*
Amasa Rush	C	36	*Owosso*
ler Stuart Russell	E	34	*Petersburg*
Comstock Russell	E	32	*Grand Rapids*
Hugh Russell, A.B., *rmount College*	C	58	*Wichita, Kan.*
Ryan	C	97	*South Bend, Ind.*
Joseph Ryan			*Sault Ste. Marie*
Thomas Ryan	C	32	*Detroit*
Ge Sada	C	55	*Monterey, Mex.*
Edwin Saenger	Ch	32	*Detroit*
arry Sage			*Port Huron*
Louis Sampson	E	69	*Niles*
Archibald Samson			*Blenheim, Ont.*
Russell Sanford		4	*La Grange, Ill.*
Ashton Saunders	M	73	*Cadillac*
J. Savage	M	36	*Dowagiac*
h Ingalls Sawyer	C	66	*Menominee*
Blaine Saxton		8	*Lambertville*
Thomas Sayles		8	*Owosso*
hacht		10	*Erie, Pa.*
luke Dunn Schalk		18	*Conneaut, O.*
John Schenk	C	36	*Chelsea*
John Scherer			*Benton Harbor*
George Schlee	M	20	*Delray*

Harold Edgar Schlesinger			*Detroit*
Anton Augustus Schlichte		8	*Chicago, Ill.*
Burton Jacob Schnur	E	24	*Glencoe, Ill.*
Bert Richtig Schober	Ch	28	*Iron Mountain*
William Frederick Schregardus	E	106	*Prairie City, Ia.*
Arthur Ferdinand Schreiber		8	*Michigan City, Ind.*
†Orlin Jacob Schrock, *a*		4	*Goshen, Ind.*
Adolph George Schulz	Mar	20	*Fort Wayne, Ind.*
Karl DeWitt Schwendener	C	36	*Saint Joseph*
Earle Barnes Scott	Ch	131	*Sterling, Ill.*
Leopold Eden Scott			*Cayman Brac, British West Indies*
Walter Glen Scott		8	*Fenton*
Ward Andrus Scranton			*Detroit*
Augustus Jae Sears	E	36	*Chicago, Ill.*
Orrin George Seaver			*Ypsilanti*
Warren Osman Seelye		8	*Detroit*
Dan Klinge Segur	Ch	40	*Toledo, O.*
James Ferris Seiler	C	34	*Hillsdale*
Zina Elliott Sevison	C	113	*Constantine*
William James Shackelton		8	*Grand Rapids*
William Day Shannon	C	62	*Morenci*
Harold Caswell Sharpe	M	35	*Grand Rapids*
Frank Thomas Shaw	C	56	*Elm*
Howard Johnson Shaw	E	36	*Detroit*
Harold Hutchison Shearer	E	32	*Bay City*
James Shearer, 2nd	M	40	*Bay City*
William Henry Shenk			*Grand Rapids*
Bernard Lacey Sherman			*Marquette*
Henry Andrew Sherman	C	110	*Owosso*
Russell Alger Shields		8	*Hancock*
Robert Arnold Shryock	E	38	*Johnstown, Pa.*
Harry Augustus Shuptrine	C	28	*Detroit*
Wesley Banks Sibley	E	20	*Pontiac*
Jay Delivan Sidener	C	99	*Sturgis*
Raymond Byron Silverman	Ch	106	*Kalamazoo*
John D. Simmers	C	36	*Grand Rapids*
Carl Jule Simon		8	*Van Wert, O.*
Zera Simon		10	*Chicago, Ill.*
Orson L. Simpson	C	52	*Freeport*
Arthur Benjamin Singleton			*Mendon*
George Duffield Slaymaker	M	115	*Detroit*
John Klein Sloatman	C	40	*Williamsport, Pa.*
Edward Alonzo Small, Jr.	Ch	43	*Highland Park, Ill.*
Sidney Ruggles Small		12	*Saginaw*
Clyde Edward Smedley	E	34	*Grand Rapids*
Maurice David Smilansky	E	105	*Detroit*
Elroy George Smith	C	36	*Grand Ledge*

ırd Freeman Smith	**M**	32	***Bay City***
Francis Smith	**M**	105	***Hanover***
bert Smith		8	***Paw Paw***
ɔr Horace Smith			***Kansas City, Mo.***
am Edward Smith			***Perry, N. Y.***
h James Smith	E	108	***Saginaw***
Evart Snider	E	12	***Cadillac***
ey Clifford Snow			***Chicago, Ill.***
Maxwell Snyder			***Chelsea***
ır Emerson Sortore		4	***Belmont, N. Y.***
ı Perry Spangler	C	32	*Saginaw*
ır D. Spencer	E	113	*Ann Arbor*
les Guido Spencer			*Ottawa, O.*
.es Willett Spooner	C	133	*Grand Rapids*
Horatio Stambaugh	M	30	*Youngstown, O.*
Cameron Starr	C	78	*Coldwater*
; Marrion Stellmann		28	*Brattleboro, Vt.*
ı James Stephenson			*Port Huron*
n Miller Sterner			*Flint*
ı E. Stevens	C	99	*Dowagiac*
Belknap Stevens			*Whitmore Lake*
Hugh Stewart	E	93	*Big Rapids*
ge Milton Stewart		24	*Ypsilanti*
ıond Griffiths Stewart	M	69	*Bay City*
Page Stewart		4	*Chicago, Ill.*
ırd Noble Stimson	M	55	*Detroit*
st Gustav Stock	M	62	*Sioux City, Ia.*
s Cleveland Stockdale			*Stockdale, Pa.*
Milton Stoddard		22	*Bay City*
; Lambert Stone	C	28	*Caledonia*
ıel Anthony Stranahan	M	49	*Wauseon, O.*
y Straub	E	107	*Dowagiac*
hard Stroh, Jr.	M	65	*Grosse Pointe*
am Yrot Stroh	Ch	93	*Coldwater*
ey Davis Strong, A.B., *Kal-ımazoo College*	C	62	*Kalamazoo*
ge Eliott Sturt			*Flint*
ice Joseph Sullivan	C	32	*Detroit*
ıond Henry Sullivan		16	*Chicago, Ill.*
l Daniel Sutherland			*Metamora*
s Irving Sutherland	M	74	*Detroit*
Monroe Sutherland			*Ann Arbor*
Ellsworth Sutton			*Pontiac*
y Bennett Swan	Ch	36	*Detroit*
ı Todd Swezey		8	*Ann Arbor*
oe Lovejoy Taft	M	68	*Ann Arbor*
William Tait	S	28	*Detroit*
ıas James Tervial Tait	E	64	*Ann Arbor*

Harry Lawrence Tanner	E	26	*Cortland, N. Y.*
Gordon Tarbell			*Rushford, N. Y.*
Theron Clark Tayler	M	32	*Detroit*
David Taylor	C	72	*Ann Arbor*
Edward Clark Taylor	C	34	*Ann Arbor*
John Alfred Teare		8	*Chicago, Ill.*
William Wolcott Tefft	C	72	*Jackson*
Arthur Gustav William Templin	E	58	*Detroit*
Colon Monroe Tenny		8	*Fenton*
George William Terry	M	74	*South Haven*
Ellis Wilby Test	M	109	*La Porte, Ind.*
George Newton Thall			*Alpena*
Lawrence Thomas	Ch	32	*Ann Arbor*
Lawrence Macy Thompson			*South Haven*
Ira Baldy Thomson		8	*Providence, R. I.*
Charles Astor Thornburgh	M	47	*Toledo, O.*
Howard Sloane Thorne			*Bay City*
Isaac Jay Thorp	E	106	*Toledo, O.*
Henry Hoag Tibbs	C	88	*Grand Rapids*
Louis DeWitt Tinkham		8	*Traverse City*
Oliver Julian Todd	C	32	*Ann Arbor*
George Seely Towar	E	24	*Detroit*
Glenn Lewis Tower	Ch	23	*Ann Arbor*
Frank Eugene Town	E	16	*Jackson*
Leigh DeLos Townsend		8	*Saline*
Neil Sherman Townsend	M	66	*Ionia*
Ray Elnathan Townsend	C	44	*Leonard*
Fred Hall Tracy	M	74	*Grand Rapids*
Carl Elmer Traut		4	*Battle Creek*
Alfred Alanson Treadway	C	73	*Grand Rapids*
Horace Alanson Treat		8	*Adrian*
Alexander Linn Trout, A.B.	Ch	139	*Ann Arbor*
Byram Clarkson Trueblood	Ch	106	*Ann Arbor*
Harold Magnus Tschirgi	S	25	*Dubuque, Ia.*
Fred Henry Tuck	M	103	*Belding*
Albert Tucker			*Imlay City*
Hubert Southwick Tullock	C	89	*Leavenworth, Kan.*
Mahlon Cleveland Tunison	C	67	*Fenton*
Thomas Turk		8	*Pontiac*
Benjamin Sayre Tuthill			*Detroit*
Charles LeRoy Tuttle	E	75	*Rochester, N. Y.*
Albert Langham Twitchell		16	*Mansfield, O.*
Frank Stuart Tyler			*Detroit*
Charles John Ullrich	C	106	*Michigan City, Ind.*
Frank Sherman Upham	C	47	*Ann Arbor*
Lloyd Leslie Urich		8	*Toledo, O.*
Jay DeWitt Utley, Jr.	M	99	*Grand Rapids*

ıto Valenzuela		20	*Bogota, Columbia, South America*
Van Haitsma		8	*Grand Rapids*
ɛs Craigie Van Valken- urgh, Jr.	C	116	*Fresno, Cal.*
Pierce Van Wye	S	20	*Warren, O.*
Donald Van Zile	C	32	*Detroit*
Albert Van Zoeren, A.B., *ope College*	E	102	*Holland*
ld Olean Vaughn	E	26	*Dexter*
Vaughn	C	61	*Otsego*
Charles Vetter			*Niles*
io Villa, A.B., *School of ines, Mexico City*	C	131	*Mexico City, Mex.*
Blaine Vincent		12	*Medina, N. Y.*
Oscar von Zellen	C	20	*L'Anse*
Waalkes	C	32	*Grand Rapids*
William Wadsworth, .B. *Williams College*	E		*Hammondsport, N. Y.*
e Otto Wagenseil	M	32	*Port Huron*
d Martin Wagenseil	E	71	*Port Huron*
Sweetland Wagner	M	70	*Ann Arbor*
nder Edward Walker		4	*Detroit*
Mallett Walker	E	50	*Saint Ignace*
Van Doren Wallace	Mar	67	*Oswego, N. Y.*
Frederick Wallack, Jr.	M	52	*Chicago, Ill.*
l Hickey Walsh, Jr.		-	*Plaquemine, La.*
as Robert Walter	C	76	*Kalamazoo*
Theodore Walther		16	*Ann Arbor*
Simon Walther	E	48	*Ann Arbor*
ı Walton	E	36	*Owosso*
Alanson Walton	C	24	*Ann Arbor*
Collins Walton	C	69	*Plainwell*
Lessiter Walton	Mar	48	*Pontiac*
Allison Waltz	M	36	*Akron, O.*
m James Fairbairn Ward	C	103	*Detroit*
e Taylor Warner	M	59	*Flint*
Warner		8	*Grand Rapids*
Lawrence Warner			*Detroit*
y Addison Warner	E	32	*Vermontville*
Bert Warren			*Detroit*
Albert Warren	M	63	*Edmore*
m Stephen Wasmund		8	*Detroit*
ogers Watson	E	112	*Saline*
Mitchell Watson		8	*Detroit*
ı Arthur Watson		8	*Grand Haven*
d Leslie Webb	Ch	52	*Muskegon*
Barceleaux Weber		8	*Saint Louis, Mo.*

Thomas Maybury Weber	S	24	*Detroit*
William Wallace Weber		8	*Salamanca, N. Y.*
Frank Edmund Weeks	M	80	*Muskegon*
Harold Julian Weeks	E	59	*Allegan*
Wesley Charles Weideman	S	27	*Bay City*
Harry Clifford Weirick			*Harrisburg, Pa.*
Grover Cleveland Wellman	C	43	*Clio*
Joseph Amasa Welton			*Grand Rapids*
Roswell Murray Wendell	M	61	*Detroit*
Edward Lucas Wenz	C	44	*Perrysburg, O.*
Ralph Linford Werden			*Crofton, Ont.*
Harry Thomas Wessinger	M	24	*Ann Arbor*
Frank Clifford West			*Fredonia, N. Y.*
Frank Hubble West		8	*Tacoma Park, D. C*
George Benson Wheeler	Ch	40	*Cortland, N. Y.*
Harold Sayre Wheeler	M	105	*Manistee*
Maurice Walter Wheeler	C	83	*Detroit*
Charles John Whipple	E	85	*Chicago, Ill.*
George James White	Ch	92	*Pontiac*
Henry Berry White	M	36	*Locke, N. Y.*
James Arba White	E	28	*Marshall*
†John Taylor Whitehead, *l*	M	24	*Chicago, Ill.*
John Tolman Whiting		4	*Chicago, Ill.*
Bert Ceylon Whitmore		26	*Charlotte*
William Arnold Whitney		3	*Jamestown*
Lawrence Charles Whitsit	C	74	*Ann Arbor*
Frederik George Whittington	E	20	*East Jordan*
Theodore William Widenmann		16	*Saginaw*
John Leslie Wierengo		16	*Muskegon*
Stanley Boardman Wiggins			*Ann Arbor*
Volney Freeman Wilcox	C	34	*Hastings*
Charles Sherman Wiley	Mar	28	*Oswego, N. Y.*
Ralph Benjamin Wiley	C	111	*Detroit*
Dean Bailey Wilhelm	M	111	*Ann Arbor*
John Chester Wilkie	M	28	*Detroit*
Paul Francis Willard	E	24	*Union City, Pa.*
Harold Beal Williams		8	*Ann Arbor*
Joe Willis	M	107	*Chicago, Ill.*
Walter Irving Willis	E	84	*Buffalo, N. Y.*
†Corwin Dale Wilson, *a*		9	*Flint*
Forrest Earl Wilson			*Caledonia*
Fred Alexander Wilson		5	*Adrian*
Joseph Paul Wilson		10	*Newtown, Pa.*
Osmond Charles Wilson		8	*West Branch*
Roy Sheldon Wilson			*Buffalo, N. Y.*
William Michael Winkler	M	69	*Saginaw*
Clarence Wise	E	54	*Otsego*
Karl Marshall Wise			*Ann Arbor*

r Owen Wisler	C	66	*Detroit*
oward Witwer			*Kalamazoo*
ick Lewis Wolf	Ch	36	*Toledo, O.*
dien Wolfrom		24	*Bellevue, O.*
Harper Wood	M	30	*Quanah, Tex.*
Le Grand Woodhams	C	37	*Kalamazoo*
s Harold Woodruff	E	38	*Ann Arbor*
William Woolley, Jr.	M	68	*Youngstown, O.*
Edward Woolley	E	107	*Ann Arbor*
s Robert Woolley	M	31	*Youngstown, O.*
Gilbert Worden	C	40	*Kalamazoo*
Albert Workman	Ch	72	*Chicago, Ill.*
Elroy Worthington		17	*Pembroke, N. Y.*
reeman Wright			*Seneca Falls, N. Y.*
Benjamin Franklin Wuer- l		15	*Toledo, O.*
Eugen Wurster		4	*Ann Arbor*
Titus Wurster		12	*Ann Arbor*
Harvey Wyman	Ch	67	*Ann Arbor*
Warner Yallowich	C	99	*Buffalo, N. Y.*
Ku Philip Yao			*Hupek, China*
Talmage Yorton		8	*Ann Arbor*
Young	M	108	*Chicago, Ill.*
m John Young	M	40	*Charlotte*
Preston Yutzey	C	37	*Ithaca*
s Christian Zabriskie	M	76	*Detroit*
Adolph Zang	Ch	71	*Denver, Col.*
Morrell Zeder		8	*West Bay City*
Waltermer Zelt	C	73	*Sturgis*
ick William Zinser	C	37	*Grand Rapids*

176. SUMMARY OF STUDENTS

Resident Graduates	8
*Graduates Studying *in absentia*	28
Undergraduates	1,156
	1,192

	First Year Students	Second Year Students	Third Year Students	Fourth Year Students	Graduate Students	Totals
Civil Engineering	First year students being required to pursue the same order of studies, are not classified.	111	78	50	16	255
Mechanical Engineering		85	76	56	14	281
Electrical Engineering		81	51	41	4	177
Chemical Engineering		27	24	15	1	67
Marine Engineering		14	5	4	1	24
Specials		10	5			15
Totals	423	328	239	166	*36	1192

*Includes all who have not yet fully completed the requirements for the degrees sought.

Officers of the Alumni Association

President	VICTOR H. LANE	'74 *e*, '78 *l*	*Ann Arbor*
Vice-President	LOYAL E. KNAPPEN	'73	*Grand Rapids*
Recorder	LOUIS P. JOCELYN	'87	*Ann Arbor*
Treasurer	G. CARL HUBER	'87 *m*	*Ann Arbor*
General Secretary	WILFRED B. SHAW	'04	*Ann Arbor*

Board of Directors

	TERM EXPIRES
LOYAL E. KNAPPEN	1907
FRED NEWTON SCOTT	1908
G. CARL HUBER	1909
VICTOR H. LANE	1910
LOUIS P. JOCELYN	1911

Register of Alumni

1860-1905

An alphabetical index of this Register is given on page 247.

This Register is not complete, as many of the graduates could not be reached owing to the fact that insufficient or incorrect addresses were in possession of the Secretary at the time the following data was collected.

†Replies to circulars sent out were not received from those before whose names the dagger (†) appears. Alumni of the Department and others will confer a favor on the Department by sending the addresses of such Alumni to James P. Bird, Secretary of the Department.

*Deaths are indicated by the asterisk (*). As full information is not in possession of the Department, notice of such deaths as are not here given should be sent to the Secretary of the Department.

1860.

FRANK KRAUSE. Locating Engr., Iowa Midland R. R., '70-1. With L. H. Evarts & Co., Maps '71-4. Asst. City Engr., Cleveland, '76. Locating Engr., N. Y. C. & St. L. R. R., '81-2. City Engr., Galion, O., '80-3. Div. Engr., C. C. C. & St. L. R. R., '85-'90. Civil Engr. *Cleveland, O.*

WILLIAM MINTO. M. Technical Soc. of Pacific Coast. U. S. Surveys 1862 and '72-5. Co. Surveyor, Siskiyou Co., Cal., '67-8. Survey of boundary Siskiyou & Shasta Cos., '72. Chief Engr., Sierra Flume and Lumber Co., '75-7 (Engineer and Contractor.) Gov't Surveys, '78-'82. Private Engr. Work., '83-9. Cal. and Nevada boundary, '89. Ass't Surveyor, S. F. Savings Union, '89-'94. Orchard business, '94-'00. Since that date, Railroad and General Engineering work.
2318 Duvant Avenue, Berkeley, Cal.

1861.

PETER S. GIBSON. M.S., '64. M. Can. Soc. C. E. Gov't Ont. Land Surveyor. Mem. Bd. of Exam. Land Surveyors. Engr. for Townships of York, North Toronto, East Toronto, etc. Dom. Land Surveyor and Civ. Engr. *Willowdale, Ont., Canada.*

Geo. H. Seymour. B.S., '60. Clerk, Aud. Gen. Office, '61-2. Private 20th Mich., '62-3. Asst. Engr., U. P. R. R., '64-7. Asst. City Engr., Council Bluffs, '67-8. Asst. Engr., K. P. R. R., '69-'70. Do. M. K. & T. R. R., '70-1. Do. N. P. R. R., '71-3. D. L. & L. M. R. R., '73. Fruit Grower, '77-'04. Gardener, '05 to date. *218 Stone Terrace, Flint, Mich.*

Joseph W. Wood. M.S., '62. Farmer. *Sumner, Wash.*

1862.

*Elmore J. Wells. M.D., (Bellevue) '67. A.M., (Lafayette) '69. Instructor Civ. Eng., U. of M., '64. Asst. Engr., N. I. R. R., '64-5. President M. B. Water Co. Physician. Died, Dec., 1904.

*Orlando B. Wheeler. A. B., '62, A.M., M.S., '65, C.E., '79. M. Am. Soc. C. E. U. S. Asst. Astronomer, Transit of Venus, '74. Do. '82. U. S. Asst. Astronomer Total Solar Eclipse, '78. U. S. Asst. Engr. on Geodetic Triangulation. Died at St. Louis. Mo., June, '96.

1863.

Ira S. Dunning. R. R. Engr., '63-'89. City Engr., Aurora, '89-'92. Asst. Engr., Aurora, Elgin & Chicago R. R. Now retired. *237 Cedar St., Aurora, Ill.*

*Geo. A. Marr. M.S., '67. M. Am. Soc. C. E. U. S. Asst. Engr. on Survey of N. & N. W. Lakes, '63-'77. Do. Mississippi River Surveys, '78-'88. Do. Mississippi River Surveys, '88-'91. U. S. Asst. Engr. and Supt. Portage Lake Ship Canal. Died, March, 1905.

†Wm. Mendenhall. U. S. Asst. Engr. Lake Survey, Astron. Corps. Prin. City Acad., Indianapolis, '67. Prof. Eng. Earlham Coll. Mining Engr., Colo. *Richmond, Ind.*

*Wm. B. Morgan. A.M., (Haverford) '56. Prof. Math. and Astr., Earlham Coll., '63-5, '67-8. Inst. Math. and Eng'g, U. of M., '65-6. Teaching, Indianapolis H. S., '72-4. Prof. Math. and Eng'g, Purdue Univ., '75-6. Do. Math. and Astr., Penn Coll., '76-'83. Do. Earlham Coll., '83-'98. Died, Feb. 24, 1904.

Stillman W. Robinson. (Civil). D.S.C. '96, O. S. U. M. Am. Soc. Mech. E., '80. Do. Am. Soc. C. E., '86. Do. Soc. Nav. Arch't and Marine Eng'r, '93. Do. Soc. for Promotion of Eng'g Education, '93. Fellow, Am. Ass'n for Advancement of Science, '83. M. Ohio Soc. Mech., Elec., and Steam Eng'rs, '01. Asst. Engr., U. S. Lake Survey, '63-'66. Asst. in Eng'g, U. of M., '66-'67. Asst. Prof. Mining Eng'g and Geodesy, U. of M., '67-'70. Prof. Mech. Eng'g and Physics, Ohio State Univ., '78-'81. Prof. Mech. Eng'g do., '81-'95. Prof. Emeritus Mech. Eng'g do., '99 to date. Insp. of Rys. and Bridges, Railroad Com'n of Ohio, '80-'84. Consulting Eng'r, Santa Fe Ry., '84. Do. Lick Telescope and Mountings, Warner & Swasey, Cleve-

land, '87. Do. Santa Fe Ry., '87-'90. Inventor, Wire Grip Fastening Co., '84-'98. Consulting Mech. Engr. McKay Shoe Mach. Co., '98. Inventor and Patentee some fifty various inventions, '66 to date. Author text book, Principles of Mechanism, J. Wiley & Sons, '96; Science Series, No. 8, '84, No. 24, '76, No. 59, '82, and No. 60, '82, Van Nostrand Co.; some twelve pamphlets on various topics, '76 to date; some twenty-one magazine articles, '63 to date; some seven articles, proceedings of Am. Soc. Mech. Eng'r, '80 to date; some two articles, proceedings of Am. Soc. C. E., '85 to date; some three articles, proceedings of Am. Ass'n Adv. Science, '83 to date. Awards at Exhibitions: three at Centennial, one at Columbian, '76-'93. Holds three copyrights on writings.
1353 Highland St., Columbus, Ohio.

1864.

CHAS. F. BELLOWS. A.M., '67. Prof. of Math., Mich. State Normal, Ypsilanti, '67-'91. Founder and Principal, Mt. Pleasant Normal School, '90-4. Now retired from active work, owing to poor health. *913 Ellis St., Ypsilanti, Mich.*

1865.

WM. BOUTON. City Engr. and Vice-Pres., Pitzman Co. of Surveyors and Engrs. *2209 Park Ave., St. Louis, Mo.*

WM. DONOVAN. U. S. Asst. Eng. Lake Survey, '65-6. Asst. Engr., J. L. & S. R. R., '67-'70. Chief Engr. do., '70-5. Res. Engr., Gt. W. R. R. of Can., '75-7. Mngr., Dept. Taxes and Collections J. L. & S. R. R. Mayor of Lansing, '84-'86. Prest., State Savings Bank, '00. State Bank Examiner for Mich., '00-'03. Deputy State Banking Com'r, '03 and at present.
214 Capitol Ave., North, Lansing, Mich.

ARTHUR HILL, (Civil). Civil Eng'r, St. Paul & Duluth R. R., Minnesota, '65-'66. Lumberman, '68 to date. Regent of the University of Michigan from '01 to date. *Saginaw, Mich.*

*DAVID McKENZIE. B.S., (Rochester) '60. Loc. Res. and Chief Engr. on R. R's in Canada and U. S. Died at Evansville, Ind., June, 1897.

†ACHILLES W. UNTHANK. R. R. Locating Engr., So. America. Prof. in Emperor's Coll., Japan. Preliminary Survey R. R. in China. Civ. Engr. *San Francisco, Cal.*

*GEO. Y. WISNER. M. Am. Soc. C. E. M. Detroit Eng. Soc. M. National Geographical Soc. M. International Waterways Com'n. M. Am. Soc. for Testing Materials. U. S. Asst. Engr. Survey, Great Lakes and Miss. River, '65-'80. Do. Survey, Miss., Des Moines and Ills. Rivers, '80-4. Supt. Const'n, 10th and 11th Lighthouse Dists., '84-7. Chief Engr., South Pass Jetty Works, '88-'90. Do. Brogus River Harbor Improvement, '89-'91. Consulting Engr. on Contract Work, '91-5. Sanitary Engr. for City of Detroit, '95-7. Member U. S. Board of Engrs. on Deep Waterways, '97-'00. (Estimated cost, $300,000,000.) Arbitrator for Water Rights at London, Ont., '01-'02. Member Board of Engrs. for Water Supply, St. Louis, Mo., '01-'02. (Estimated expenditure of $25,000,000.) Consulting Engr., Montreal, Ottawa & Georgian Bay Canal Co., '02-'05. (Estimated cost, $85,000,000.) Consulting Engr., U. S. Reclamation Service, '03-'05. (Estimated work under contract between $25,000,000 and $30,000,000, involving the construction of the highest dam and largest artificial lake in the world.) Author of numerous technical and descriptive papers and reports on Engineering works. Died at Detroit, Mich., July 3, 1906.

1866.

*ABEL R. FLINT. U. S. Asst. Engr. Lake Survey. Died at Detroit, May, 1884.

÷LEWIS FOOTE. U. S. Engr. Lake Survey, '64-'74. Farmer.
Worthington, Minn.

*ARCHIBALD JOHNSON. M.S., '72. Rodman, Survey of Public Lands, '66-7. Compassman of Do., '68-9. Asst. Engr. on R. R., '70-2, '77-8, '82. U. S. Deputy Surveyor, '73-4. Reservoir Surveys, '75, '80-2. Asst. Engr. on Locks and Dams, Eau Claire, Wis., and Miss. River, '79. U. S. Asst. Engr., '82-'99. Died at St. Paul, Minn., October, 1899.

÷HORACE W. LEWIS.

÷JOHN W. REMINGTON.

*CASSIUS M. C. SNOVER. Engr., C. & N. W. R. R., '66-7. Chief Engr., Midland Pacific R. R., '69. Div. Engr., M. C. R. R., '71-'86. Died at Detroit, February, 1886.

ARTHUR P. WOOD. Asst. Engr., U. P. R. R., '66-'69. Asst. Chief Engr., Omaha & N. W. R. R., '69-'72. Supt. Const'n Texas & Pacific R. R., California Div., '72-3. Contracting in Cal., '74-'79. Chief Engr., O. N. & B. H. R. R. and O. & R. V. R. R., '79-'81. R. R. Contractor from '81 to date.
415 First National Bank, Omaha, Nebr.

1867.

GEO. H. BENZENBERG, (Civil). M. Am. Soc. C. E. M. Am. W. W. Assoc. U. S. Asst. Engr. Lake Survey, and Locating and Const'n Engr., C. M. & St. P. and M. & N. R. R's, '68-'74. Asst. City Engr., Milwaukee, '74-'81. City Engr. and Pres't Board Public Wks., Milwaukee, '82-'99. Consulting Engr., Cinn. W. W., '97-'05. City Engr. and Pres't Board Public Wks., '82-'99. Consulting Engr., Cleveland W. W., '01-'04. Chief Engr., Cinn. W. W., '04 to date. Consulting Engr., Kansas City, Mo., W.

W., '03 to date. Consulting Engr., Omaha W. W., '05 to date. (On all of above work during heavy construction.) Has, and is serving on numerous Commissions called to advise and report on important improvements.
255 Greenbush St., Milwaukee, Wis.

Amos E. Dolbear. (Mining). A.M., '67. Ph.D., '83. A.B. (Ohio Wes.), '66. A.M. do., '69. L.L.D., '02. L.L.D., (Ohio Wes.) '05. M. Am. Ass'n Advancement of Sc., M. Am. Acad. Arts and Sciences (Boston). M. Washington Acad. of Sc. M. Amer. Social Sci. Ass'n. Prof. Nat. Sc. Bethany Coll., '68-'74. Prof. Physics and Astr. since '74. ***Tufts College, Mass.***

Lowell A. Goodman. Horticulturist.
4000 Warwick Boulevard, Kansas City, Mo.

Louis P. Judson, (Civil). Asst. Engr. U. S. Lake Survey, '67. Do. Gen. Weitsel, U. S. Canal Survey, New Albany. Ind., '68. Do. C. R. I. & P. R. R., '68-9. City Engr., Council Bluffs, '70-'82. **Gen. Eng'g, Council Bluffs, '82 to date.**
929 6th Ave., Council Bluffs, Ia.

†William R. Rising. (Mining). A.B., (Hamilton) '64. A.M., (Hamilton) '65. Ph.D. (Heidelberg). Prof. Chemistry, Univ. of California. ***Berkeley, Cal.***

***James Steel. A.B.,** (U. S. Naval Academy) **'68. Engr., U. S. Navy, '68. Died at sea, August, 1869.**

†Alexander Thompson. Mining Engr., '67-'70. Asst. Prof. Mech. Eng., Ills. State Univ., '70-1. Asst. Prof. Math. and Civ. Eng., Iowa Univ., '72-3. Prof. Mech. Eng., Iowa Agrl. Coll., '73-'84. Vice-Pres't K. C. W. & G. R. R. and Chief Engr. N. Am. Land and Timber Co. ***Lake Charles, Ia.***

Ebenezer S. Wheeler. M. Am. Soc. C. E. M. Franklin Institute. M. Mich. Eng'n Soc. M. Detroit Eng'g Soc. U. S. Asst. Engr. Lake Survey, '67-'82. Do. River and Harbor Impts., '82-'89. Do. in charge of St. Mary's Ship Canal, '89-'97. Genl. charge Surveys, Nicaragua Canal, '98-9.
76 Delaware Ave., Detroit, Mich.

1868.

*Francis M. Bain. Asst. Engr., C. & A. R. R. Transitman Bellaire and S. W. R. R. Died, March, 1904.

†Edward C. Burns. M. Am. Soc. C. E. Asst. and Chief Engr. R. R. Location and const'n. U. S. Asst. Engr., Lime Kiln Crossing. Engr., Sewers and Pavements. *Jamestown, N. Y.*

*Byron R. Chaffee. (Mining). Died at Marcellus, N. Y., May, 1870.

Brutus J. Clay. Manufacturer. Farmer. U. S. Commissioner to Paris Exposition, '00. Declined position offered of American Minister to Argentine in 1897. At present appointed by President Roosevelt as American Minister to Switzerland. (March 6, 1905.) *Berne, Switzerland.*

JOSEPH B. DAVIS. M. Am. Soc. C. E. M. and Past President of Mich. Eng. Soc. Hon. M. Eng. Soc., U. of M. Asst. Engr., M. R., F. S. & G. R. R., and Loc. Engr., O. & B. R. R., '68-9. Loc. Engr., J. L. & S. R. R., '70-1. Swathmore College, '71-2. Asst. Prof. C. E., U. of M., '72-'91. Prof. Geodesy and Surveying, U. of M., '91 to date. Associate Dean, Department of Eng., U. of M., '04 to date. *731 S. Ingalls St., Ann Arbor, Mich*

HENRY R. DURKEE. (Mining). M. Chi. Acad. of Sci. Mgr. Silver Smelting Wks., Stockton, Utah. Mining Engr. in Utah, Nev. and Cal. Mines. Pres't Chicago Asbestos Mining and Mfg. Co. Dealer in Pig Iron. Treasurer, Travers-Durkee Copper Mines and Works, Sonora, Mex. *805 Rookery Bldg., Chicago, Ill.*

*TOBERT ENTREKIN. (Mining). Died at Independence, Mo., October, 1877.

*MILO K. HAVENS. Civ. Engr. Died at St. Louis, Mo., 1885.

†EDWARD S. JENISON. M.S., '72. Architect of Univ. Hall. Architect. *4356 Ellis Ave., Chicago, Ill.*

†EDGAR S. JOHNSTON. M.D., '79. Physician. *Gibsonburgh, O.*

WILLIAM S. MCHARG. (Mining). M. Am. Soc. of C. E. Engr. of Water Supply and Sewerage of Towns, '69-'79. Do. Building, '79-'90. Do. World's Columbian Exposition, '90-'93. Do. Towns and Buildings, '93-7. Consulting Engr. intersepting sewers, City of Chicago, '97 to date. *3227 Beacon St., Chicago, Ill.*

*PHILETUS H. PHILBRICK. M.S., '73. Asst. Engr., J. Ft. W. & C. R. R., '68-9. Chief Engr., Owosso & N. W. R. R., '69-'72. Do. T. A. A. & N. M. R. R. Asst. Engr., Mich. Air Line. Prof. Civ. Eng., Iowa Univ., '73-'87. Chief Engr., K. C. W. & G. R. R. N. Am. Land and Timber Co. Died Oct., 1902.

†CHARLES POORE. Civ. Engineer. *Western Springs, Ill.*

†ROLLIN J. REEVES. U. S. Govt. Surveyor, Dak., Wyo., Oregon, Cal., N. Mex., Minn., Idaho, Colo. and Montana, '70-'82. Cashier 1st Nat. Bk., Wilbur, '82-6. Real Estate, '86-'90. Vice-Pres't Columbia Milling Co., '94-5. U. S. Circuit Court Com'r. *Wilbur, Wash.*

†FILLMORE M. SMITH. (Mining). Mining Engr. and Chemist. *Syracuse, N. Y.*

MILFORD N. WELLS. M. Mich. Engineering Soc. Asst. Engr., Ft. W. J. & S. R. R., '68-'70. Do. Mich. Air Line, '70-2. Do. J. L. & S. R. R., '72-4. Chief Engr., T. A. A. & N. M. R. R., '78-'80. Asst. and Loc. Engr., A. T. & S. F. R. R., '80-2. Min. Engr. do., '82-5. Chief Engr., S. K. R. R., '85-8. Res. Engr., A. T. & S. F. Ry, '88 to date. *709 S. Central Ave., Chanute, Kan.*

1869.

†HUGH B. ALEXANDER. Asst. Engr. San. Dist., Chicago. *Geneva, Ill.*

WM. H. BOARDMAN. (Civil). A.B., '68. Editor and Publisher Pres't and Editor of the Railroad Gazette Co. *83 Fulton St., New York, N. Y.*

Charles F. Brush. (Mining). M.E., '69. M.S., (U. of M.) '99. Ph.D., L.L.D., (Western Reserve) '80-'00. L.L.D., (Kenyon) '03. (Cross of the Legion of Honor by French Government, 1881). M. Am. Soc. Mech. E., do. Am. Inst. E.E., do. Am. Chem. Soc., F. Am. Ass'n Adv. Sci. Life member British Ass'n Anal. Chemist and Expert, '69-'73. Electrical Engr. and Inventor. Inventor of Brush Electric Light Apparatus. Recipient of the Rumford Medals, '99. Inventor of Electric Arc-lighting. (This is now universally conceded, at least in the U. S. The Rumford Medals were awarded, "For the Practical Development of Electric Arc-Lighting," Am. Acad. of Arts and Sciences, Boston.) Scientific Investigator.
1003 Euclid Ave., Cleveland, Ohio.

Orson O. Fox. Merchant. *Pleasant Prairie, Wis.*

Chas. H. Hamilton. (Mining). Wis. Legislature, '78. Milwaukee Sch. Bd., '89-'[illegible]. Do. Common Council, '92-4. City Atty., '94. Atty at Law. *738 Marshall St., Milwaukee, Wis.*

*James C. Holliday. (Mining). Engr., Milwaukee Iron Mfg. Co., '70-2. Real Estate, Minneapolis. Mining Engr. Died at Buffalo, N. Y., October, 1898.

*George B. Lake. Asst. Engr., A. T. & S. F. R. R., '71. Div. Supt. do., '76. Supt. Track and Bridges do., '78. Chief Engr. do., '84. Died at Topeka, Kan., April, 1884.

Daniel H. Rhodes. Div. Engr. on Mich. R. R's, '69-'72. Do. C. & A. R. R. and B. & S. W. R. R., '72-8. Asst. Engr., Res. Engr. and Supt., A. T. & S. F. R. R., '79-'84. Engr., A. T. & S. F. R. R., '84-6. Chf. Engr., W. & W. and K. P. & W. R. R., '86-9. Chf. Engr. and Supt. do., '89-'90. Supt., A. T. & S. F. R. R., '90-4. Engr. and Supt., W. & W. Consolidated, '95-8. Asst. Chf. Engr., K. O. C. & S. W. Ry. (A. T. & S. F.), '98-'00. Gen'l Mngr., Concolidated Zinc & Lead Co., '00 to date.
213 W. 4th St., Joplin, Mo.

Albert A. Robinson. (Civil). M.S., '71. L.L.D., 1900. M. Nat'l Geographical Soc. M. Franklin Inst. M. Academy of Political and Social Science. M. Am. Soc. C. E. Ass't on U. S. Lake Surveys in astronomical field work and triangulation of Great Lakes, '66-'68. Ass't Engr., St. Joe & D. C. R. R., '69-'71. Ass't Engr., A. T. & S. F. Ry., '71-'73. Chief Engr. do., '73-'90. Div. Supt., N. Mex. Div. do., '80-'81. Supt. Bridges, Buildings and Water Service do., '81-'83. Ass't Gen. Supt. do., '83. Gen'l Sup't do., '83-'84. Gen'l Manager do., '84-'86. Second Vice-Pres't do., '86-'88. Second Vice-Pres't and Gen'l Mgr. do., '88-'93. Gen'l Mgr., Gulf Col. & Santa Fe Ry., '88-'93. Gen'l Mgr., Sonora Ry., '88-'93. Pres't, Mexican Central Ry., '93 to date.
25 Broad St., New York, and City of Mexico, Mex.

*Thomas J. Seeley. M. Am. Soc. C. E. Chief Engr., Chicago & Millington R. R., '69-'76. Asst. Engr., A. T. & S. F. R. R., '77-'83. Died in Kansas, October, 1883.

LEMAN L. DICKINSON. Fruit Grower
R. F. D. No. 4, Grand Rapids, Mich.

*J. CLEMENT EATON. U. S. Lake Survey, '76-9. Died at Tecumseh, Mich., February, 1881.

EMERSON W. GRANT. Am. Soc. C. E. Rodman and Topographer, Mo. and Miss. River Surveys, '79-'80. Rodman A. T. & S. F. Ry., '80. Transitman, do., '80-3. Res. Engr. do., '83-6. Asst. Engr. do., '86-7. Res. Engr. (Const'n) do., '87-88. Office Engr. (Const'n) Ft. Wayne & Rio Grande Ry., '89-'90. Loc. Engr. R. R. Surveys, Cal., '90. Min. and Topographical Surveys, Argentine Smelting and Refining Co., Mex., '91-2. Res. Asst. and Loc. Engr. A. T. & S. F. Ry., '92-5. Asst. Engr. Ill, Mo. & New Mex. Div'n A. T. & S. F. Ry., '95-8. Res. Engr. New Mex. Div'n, do., '98-'00. Loc. Engr., do., '00-'02. Asst. Engr. in office of Chief Engr., do., '02-'06.
2407 Topeka Ave., R. F. D. No. 2, Topeka, Kansas.

JOSEPH WARREN HOOVER. M. Am. Soc. C. E. Engr. Indianapolis Bdge. Co., '75-7. Eng. of Const. W. I. Bdge. Co., Canton, O., '78-'84. Bdge. Engr. and Gen'l Agt. Wrought Iron Bdge. Co., Kansas City, '84-'00. Contracting Mngr. Am. Bdge. Co. at Kansas City, '00-2. Gen'l Agt. Canton Bdge Co. at Kansas City, '02 to date. *514 New York Life Bldg., Kansas City, Mo.*

*JOHN H. MORRISON. U. S. Asst. Engr. N. & N. W. Lake Survey. Do. Miss. Riv. Surv. and Imp. Asst. Engr. P. Ft. W. & C. R. R.; C. R. I. & P. R. R.; St. P. M. & M. R. R. Civ. Engr., St. Paul, Minn. Real Estate. Died at Columbus, O., January 7, 1897.

†MARTIN L. NEWTON. Principal High Sch., LaPorte, Ia., '76-8 and '83-5. Chf. Engr. D. I. & D. Ry., '87-8. Do. W. & C. F. Rapid Transit Co., '96. City Engr. and Co. Surveyor, '89.
Waterloo, Ia.

*GEORGE E. PANTLIND. LL.B., '78. Lumber Dealer, Grand Rapids. Died at Chicago, March, 1896.

†EDWARD I. PARSONS. Supt. Schools, Huron, O., '76-'80. Mining and Min. Surv., '80-3. Const. Engr. Pacific Cable Const. Co., '83-'90. Civil Engineer. *332 Bay St., San Francisco, Cal.*

WILLIAM H. POTTER. Asst. Engr. Penna. Co., '75-'80. Gen'l Rd. Master, Penna. Co., '80-3. Engr. Maintenance of Way, Penna. Co., '83-'95. Supt. Penna. Co., '95-'03. V. Pres't Cherry Valley Iron Wks., '96-8. Pres't do., '98-'01. Mfg., '03 to date.
532-534 West 22nd St., New York City, N. Y.

†EDGAR D. ROOT. Asst. to City Engr., Jackson, Mich., '76. Clerk M. C. R. R. and Blue Line. *Medinah Bldg., Chicago, Ill.*

WALTER S. RUSSEL. M. Am. Soc. M. E. and V. Pres't, '98. M. Am. Inst. Min. E., do. Detroit Engr. Soc. and its first Pres't. M. Mich. Engr. Soc. Pres't and Gen'l Mngr. Russel Wheel & Foundry Co., '80 to date.
Russel Wheel & Foundry Co., Detroit, Mich.

Luther E. Ferguson. U. S. Lake Survey, '74. Farmer and Horticulturist, '76 to date. *White Pigeon, Mich.*

Chas. P. Gilbert. M. Am. Soc. of C. E. Draftsman and Sec. Engr. M. K. & T. Ry., St. L. & S. E. R. R., '70-'71. U. S. Asst. Engr., St. Mary's Falls Canal, '71-'74. U. S. Asst. Eng. in charge Sand Beach Harbor of Refuge, '74-'88. Gen'l Mngr., Edison Illum. Co., Detroit, '88-'96. Gen'l Mngr., Sacramento Elect., Gas and Ry. Co., '96-'99. Pres. Pac. Coast Elect. Transmission Ass'n, '97-'98. Gen'l Mngr., Standard Elect. Co. of Cal., '99-'01. Retired from active business, '01. *P. O. Box 81, Ben Lomond, Cal.*

***James A. Hayward.** U. S. Harbor Survey, '73. U. S. Asst. Engr., Galveston Harbor. Drowned near Texas Coast, August, 1880.

Chas. J. Kintner. (Civil). M. Am. Inst. of E. E. M. Railway Signal Ass'n. U. S. Asst. Engr. and Astronomer, Wheeler Geog. Survey, '77-'78. Asst. Prof., Watson, Mich., Observatory, 2 years. City Recorder, Ann Arbor, 1 year. Astronomical Asst. and Engr., U. S. Surveys under ——— Wheeler, 2 years. Examiner, U. S. Patent Office, 9 years. Chief Clerk, U. S. Patent Office, 1 year. Solicitor of Patents and Electrical Expert and Engr. to date. *45 Broadway, New York, N. Y.*

Michael A. Meyendorf. (Civil). Engr., Big Wabash Bridge. Do. No. Pac. R. R., '72. Deputy U. S. Min. Surveyor, Arizona and Montana, '73-'74. Supt. Const'n, U. S. Assay Office, Helena, '75. Melter, U. S. Assay Office, Helena, '76-'93. City Engr., Helena, '94-'95. Lecturer, '95-'96. With Rep. Nat'l Committee, '96. Special Agt., General Land Office, '97 to date. *217 So. Broadway, Los Angeles, Cal.*

†**Geo. W. Mickle.** R. R. Survey in Iowa, '70. U. S. Lake Survey, '70-'01. Asst. to Prof. Watson, Preparing Lunar Tables, '71-'73. Contractor, '71-'77. Mickle & Bird Map Co., Kansas, '77-'81. Dealer in Agrl. Machinery, '81-'91. Real Estate and Loans. *Kansas City, Mo.*

Alfred Noble. (Civil). L.L.D., '95, Michigan. L.L.D., '04, Wisconsin. M. Am. Soc. C. E. M. Western Soc. of Engrs. U. S. Asst. Engr., St. Mary's Falls Canal, '70-'82. Gen. Supt. do., '81-'82. Res. Engr., Shreveport Bridge, '82-'83. Gen. Asst. Engr., N. P. R. R., '82-'86. Res. Engr., Washington Bridge, '86-'87. Do. Cairo Bridge, '87-'89. Do. Memphis Bridge, '88-'92. Asst. Chief Engr., Belfontaine, Alton and Leavenworth Bridges, '92-'94. Mem. Nicaragua Canal Com'n. '95. Mem. U. S. Board of Engrs. on Deep Water Ways, '97-'00. Pres., Western Soc. Engrs. Mem. Isthmian Canal Com'n, '99-'04. Chief Engr.. East River Div. P. N. Y. & L. I. R. R. Co., '02-'05. Pres., Am. Soc. C. E., '03. Civil Engr. Mem. Board of Consulting Engrs., Isthmian Canal, '05-'06. *1 W. 34th St., New York, N. Y.*

Register of Alumni

1860-1905

An alphabetical index of this Register is given on page 247.

This Register is not complete, as many of the graduates could not be reached owing to the fact that insufficient or incorrect addresses were in possession of the Secretary at the time the following data was collected.

†Replies to circulars sent out were not received from those before whose names the dagger (†) appears. Alumni of the Department and others will confer a favor on the Department by sending the addresses of such Alumni to James P. Bird, Secretary of the Department.

*Deaths are indicated by the asterisk (*). As full information is not in possession of the Department, notice of such deaths as are not here given should be sent to the Secretary of the Department.

1860.

FRANK KRAUSE. Locating Engr., Iowa Midland R. R., '70-1. With L. H. Evarts & Co., Maps '71-4. Asst. City Engr., Cleveland, '76. Locating Engr., N. Y. C. & St. L. R. R., '81-2. City Engr., Galion, O., '80-3. Div. Engr., C. C. C. & St. L. R. R., '85-'90. Civil Engr. *Cleveland, O.*

WILLIAM MINTO. M. Technical Soc. of Pacific Coast. U. S. Surveys 1862 and '72-5. Co. Surveyor, Siskiyou Co., Cal., '67-8. Survey of boundary Siskiyou & Shasta Cos., '72. Chief Engr., Sierra Flume and Lumber Co., '75-7 (Engineer and Contractor.) Gov't Surveys, '78-'82. Private Engr. Work., '83-9. Cal. and Nevada boundary, '89. Ass't Surveyor, S. F. Savings Union, '89-'94. Orchard business, '94-'00. Since that date, Railroad and General Engineering work. *2318 Duvant Avenue, Berkeley, Cal.*

1861.

PETER S. GIBSON. M.S., '64. M. Can. Soc. C. E. Gov't Ont. Land Surveyor. Mem. Bd. of Exam. Land Surveyors. Engr. for Townships of York, North Toronto, East Toronto, etc. Dom. Land Surveyor and Civ. Engr. *Willowdale, Ont., Canada.*

†Henry C. Ripley. U. S. Engr., Imp. Great Lakes and Gulf of Mexico, '70-'90. Civ. and Hydrographic Engineer, Private Practice, '90-'99. *Galveston, Tex.*

†Wm. J. Waters, (Mining).

*Warren C. Willits. Deputy U. S. Min'l and Land Surveyor. Examining Clerk in U. S. Sur. Gen's Office for Colo. Died at Denver, Colo., October, 1901.

1871.

†Albert E. Baldwin.

Allen P. Boyer. President of Goshen Mfg. Co. Also inventor and owner of a number of valuable patents that are manufactured by the Goshen Mfg. Co. Manufacturer. *313 So. 6th St., Goshen, Ind.*

*James D. Burr. M. Am. Soc. C. E. Loc. Engr. on A. T. & S. F. R. R., '72-'73. Res. Engr., C. & S. R. R., '75-'77. Asst. Engr., A. T. & S. F. R. R., '77-'86. Died at Topeka, Kan., May, 1886.

†John Eisenmann. U. S. Asst. Engr., Lake Survey and Miss. Riv. Com., '71-'82. Prof. Eng. and Drawing, Case Sch. of App. Science, '82-'86. Consulting Architect, Cleveland Bd. Education. Do. City Hall Com'n. Arch't, Ohio Masonic Home, etc. Mem. Ohio State House Commission. Architect and Engineer. Managing estates. *Cleveland, O.*

John A. Fulton. M. Am. Soc. C. E. M. Western Soc. of C. E. Loc. and Const. Engr., Cin. So. R. R., '73-'75. Div. Engr., A. T. & S. F. R. R., '76-'80, '82 and '88. Do. A. & P. R. R., '81. Engr., Smith Bridge Co., '83-'85. Asst. Engr., C. S. F. & Cal. R. R., '86-'87. Res. Engr., T. St. L. & K. C. R. R., '88. Asst. Engr., A. T. & S. F. R. R. Engr., The Muncie & Portland Traction Co., '05-'06. *153 West Canfield Ave., Detroit, Mich.*

Josiah L. Littlefield. Co. Surveyor, Clark Co., Mich., '72-'76. Lumbering and Mfgr. of lumber, farming and stock raising, from '76 to date. Pres't and Gen'l Mngr. at present of the Farwell Portland Cement Co. *Farwell, Mich.*

*Lyman Mason. B.S., (Mich. Agrl.) '69. M.S. do., '71. Asst. Engr., J. L. & S. R. R., '71-'72. Died at Gaylord, Mich., July, 1881.

Adrian J. Parshall. Hydrographer, U. S. Geol. Survey. *2102 Warren Ave., Cheyenne, Wyoming.*

*Baron H. Pennington. Surveyor and Farmer. Died at Macon, Mich., February, 1896.

†Elliott D. Perry. *Salt Lake City, Utah.*

†Charles Pratt. A.M. (Madison), '76. M.D. (Jefferson Med. Coll.), '81. U. S. Asst. Engr. Lake Survey, '72-8. Do. St. Mary's Ship Canal, '78-'81. Physician. *Fall Brook, Pa.*

Henry G. Prout. (Civil) A.M. (Yale) Honorary, '02. M. Am. Soc. C. E. Corres. M. Am. Geog. Soc. In charge Survey Riverside Imp., Cook Co., Ill., '71. Topog. U. S. Expedition, Yellowstone. Engr. P. & Y. R. R. Do. Saddle Riv. R. R., '72. Major of Engrs. and Col. of Staff, Egyptian Army. Governor Equatorial Provinces, '74-8. Chief Editor Railroad Gazette, '87-'03. 1st Vice Pres't and Gen. Mgr., Union Switch & Signal Co., '03 to date. *143 Liberty St., New York N. Y.*

Alexander B. Raymond. M. Detroit Engr. Soc. Chainman, then leveler, Chicago & Mich. West Shore Ry. (Construction Montague to Pentwater), '71-2. Asst. Engr. M. C. R. R., '72-3. Do. N. Y. C. R. R., '73-5. Asst. City Engineer, Detroit, '75-7. Merchant, Detroit, '77-'97. Sanitary Engr. Bd. of Health, Detroit, from '97 to date. *91 Prentis Ave., Detroit, Mich.*

***Curtis C. Smith.** Died at Pomeroy, O., September, 1872.

†**Samuel W. Walker.** Lumber Merchant. *Munich, Mich.*

John B. Webb. Fellow and Ex. Vice Prest. A. A. A. S. A.S. Mech. E. A. Math. Soc. Circolo Mathematico di Palesmo. National Geographical Soc. Judge at International Elec. Exhib. at Philadelphia (1884). International Juror at Louisiana Purchase Ex. (1904). Asst. Prof. Civ. Eng. U. of M., '71. Prof. Civ. Eng. Ill. Univ., '72-8. Prof. Applied Math. and Theoretical Mechanics, Cornell Univ., '80-5. Prof. Math. and Mech. Stevens Inst. *Hoboken, N. J.*

1872.

†**Horace G. Burt.** *Omaha, Nebr.*

Cornelius Donovan. M. Am. Soc. C. E., do. Am. Ass'n Adv. of Sci. Asst. Engr. J. L. & S. R. R., '72-4 U. S. Asst. Engr. Lake Survey (Northern and Northwestern Lakes), '74-6. U. S. Asst. Engr. in charge of Jetties, Mouth of So. Pass, Miss. River, '76-'02. U. S. Asst. Engr. in charge of Jetties, Mouth of So. Pass and Southwest Pass, Miss. River, '02 to date. (In charge of work being done at the mouth of South Pass, and Southwest Pass of the Miss. River. Jetties being built at the mouth of Southwest Pass, and is one of the most extensive harbor improvements in this country. In this connection two large hydraulic dredges are being operated under his direction, while minor river and harbor works in this district also receive his attention.) *Chess Club, New Orleans, La.*

†**John H. Flagg.** M.D. '74. U. S. Asst. Engr. Harbor Imp. Engr. Colo. Cen. R. R. Engr. for Nat'l Gas Co., Chicago. Do. Alley "L" R. R. Contracting Engineer. *94 Goethe St., Chicago, Ill.*

***Joshua L. Gillespie.** Ph.B. '71. M. Am. Soc. C. E. U. S. Asst. Engr. Falls of St. Anthony, Minn., '73-7. Do. Miss. River Imp. Died at Hartford, Conn., August, 1890.

OTTO J. KLOTZ, (Civil). L.L.D. (Univ. of Toronto), '04. F. of the Royal Astron. Soc. Do. of the Am. Assoc, for the Adv. of Sci. Hon. M. New Zealand Inst. M. Washington Acad. of Sci. Do. Nat'l Geog. Soc. Do. Canadian Inst. Private Practice, '72-8. Field Astronomer, Dept. of Interior, Canada, '85. Alaska Boundary Survey, '93-4. First astronomic longitude girdle round the world, '03. Magnetics, Gravity, Seismology. Astronomer for Dominion Gov't. *437 Albert St., Ottawa, Canada.*

JOHN A. MITCHELL. M. Mich. Engr. Soc. Asst. Engr. J. L. & S. R. R., '72-3. City Engr. and County Surveyor, Ludington, '74-5. U. S. Asst. Engr. River and Harbor Works, East Shore, Lake Mich., '77-'93. Civ. Engr. and Contractor, '93-'05. *Ludington. Mich.*

THOMAS O. PERRY, (Civil). B.A,. '69. Engr. U. S. Wind Eng. and Pump Co. and Eclipse Wind Eng. Co., '76-'83. Airmotor Co., Chicago. '87-'97. Invented "Aermotor," '82-3. Inventor and Mfgr. Work more in the nature of Mech. rather than Civ. Engr. Time unaccounted for has been given to experimental work. especially with pumps and windmills. Results of some experiments with windwheels were published in Water Supply and Irrigation Paper, No. 20, by the U. S. Geological Survey Dept. *5328 Prairie Ave., Chicago, Ill.*

EDMUND M. SPALDING. Engr. R. R.'s in No. Mich., '72-8. U. S. Asst. Engr. River and Harbor Imp., Yellowstone River and Superior and Dutluth Harbors, '78-'80. R. R. Loc. and Const. Engr., '80-'90. Civil and Consulting Engr., private practice, Milwaukee, '90-'05. Chief Engr., Milwaukee Southern Ry., Milwaukee. *106 Mason St., Milwaukee, Wis.*

MARVIN F. TEMPLE. Levelman, J. L. & S. R. R., '72-3. Teaching and business, '74-81. Asst. Engr. A. T. & S. F. R. R., in N. Mex., '81-2. Asst. Engr. in Gen'l Office, A. T. & S. F. R. R., '82-5. Asst. Engr. B. & M., Surveyor, '85. Div. Engr. C. B. & N. R. R. (Wis. and Minn.), '85-6. Div. Engr. A. T. & S. F. R. R. and C. S. F. and C. R. R. (Kans. and Mo.), '86-8. Asst. Engr. U. P. R. R. (Wyoming), '89. Asst. Engr. G. C. & S. F. Ry. (Texas and I. T.), '90-2. Res. Engr. G. C. & S. F. Ry. (Texas and I. T.), '92-3. Private practice and City Engr., Temple, '94-7. Asst. Engr. G. C. & S. F. Ry., '97-'01. Chief Engr. G. B. & K. C. and G. B. & G. N. Rys., '01-'03. Res. Engr. G. C. & S. F. Ry., '03-'04. Res. Engr. and Chief Engr. G. C. & S. F. R. R. (Jasper and Eastern construction) at present time. *Beaumont, Texas*

MATTHEW TSCHIRGI, JR., (Civil). M. Ia. Soc. C. E. Co. Surveyor. Dubuque Co., Ia., '76-'91. City Engr., Dubuque, '77-'91. Pres't Dubuque Construction Co., '91-'98. Consulting Engr., '98-'06. *46 Henion St., Dubuque, Ia.*

Robert S. Woodward. Hon. Ph.D. (U. of M.), '92. Hon. LL.D. (U. of W.), '04. Hon. Sc.D. (U. of Pa. and Columbia Univ.), '05. Asst. Engr. U. S. Lake Survey, '72-'82. Asst. Astron. U. S. Transit of Venus Com'n, '92-4. Astron., Geographer, and Chief Geographer, U. S. Geolog. Survey, '84-'90. Asst. U. S. Coast and Geodetic Survey, '90-3. Prof. Mechanics and Mathematical Physics, Columbia Univ., '93-'05. Dean, School of Pure Sci., Columbia Univ., '95-'05. Pres. Carnegie Institution of Washington, '05.
Carnegie Institution of Washington, Washington, D. C.

1873.

Frank E. Bliss. LL.B., '79. Civ. Engr., '73-5. Atty. at Law.
Cleveland, O.

John H. Darling. M. Am. Soc. C. E. Asst. Engr. Lake and Miss. Riv. Survey, '73-'82. Do. U. S. Harbor Imp., '83 to date. Principal Asst. Engr. River and Harbor Imp., Lake Superior Dist.
532 W. Third St., Duluth, Minn.

Thomas Emery. Architect and Builder, '73-'93. Lumberman and Mfgr. to date. *630 S. Weadock St., Saginaw, Mich.*

*Edwin J. Ferdon. Lumber Trade, '77-'81. Died at Detroit, November, 1881.

Frank W. Guernsey, (Civil). Co. Surveyor, '73-'81. Co. Supt. Sch. Plymouth Co., Ia., '78-'80. Cash. Nat. Bank, '90-8, Co. Treas., '98-'02. Asst. Cash. Garfield Co. Bank, '04-'05. At present in real estate business (Guernsey & Peabody) and surveying.
Dayton, Washington.

William J. Head, (Civil). Sturgeon Bay and Lake Mich. Ship Canal, '71-2. Secy. and Treas. Ferd. Heim Brewing Co., Kansas City, Mo., '72-6. Mngr. George Bullen & Co., Malsters, Chicago, '93-'04. At present Vice Pres't Winona Malting Co., Winona, Minn. *87 Rush St., Chicago, Ill.*

*Joseph W. Perkins. Chf. Dftsman Bldg. Dept. A. T. & S. F. R. R. '87-9. Architect, '89-'96. Asst. State Archt. Kan., '92-4. Archt. City of Mexico, '96. Died Feb. 27, 1905.

†Clarence M. Stevens. Co. Surveyor. Asst. Supt. Yellowstone Park. Dept. U. S. Mineral Surveyor. City Engr.
Mt. Clemens, Mich.

†William Voight, Jr. U. S. Asst. Engr. Lake Survey. City Engr. Detroit. Asst. Engr. A. T. & S. F. R. R., '76-'83. Sec. and Treas. Home Brewing Co. *661 St. Aubin Ave., Detroit, Mich.*

†Josiah W. Willis. U. S. Lake Survey, '71. With Bay City *Chronicle*, '73. Contractor and Builder, '73-4. Prin. of School, Bay City, '74-5. Prin. of Pub. Sch. 48, Buffalo, '78-'99.
47 12th St., Buffalo, N. Y.

*Chas. M. Winchell. U. S. Asst. Engr. Lake Survey, '74-8. Do., Miss. Riv. Com., '78-'85. '88-'95. Do. Surveys of Pass Cavallo and Arkansas Pass, Tex., '86-7. Engr. Street Dept. St. Louis, '96. U. S. Asst. Engr. Died May 8, 1904.

1874.

HORACE BARNARD. Co. Comr., '87-'90. Pres. Frederick Mill. Co., '85-91. Dep. Co. Treas., '97-'01. Farmer and Surveyor. *Frederick, S. Dak.*

†CLARENCE O. BEAN. Asst. Engr. N. P. R. R., '80-3. City Engr. Tacoma, '83. Engr. Tacoma Land Co. Civ. Engr. *Tacoma, Wash.*

CHAS. L. DOOLITTLE. Sc.D., '96. F. Am. Assoc. for Adv. of Sci., Am. Philosophical Soc., Astron. and Astrophysical Soc. of Am. Astronomische Gesellschaft. Asst. U. S. Northern Boundary Survey, '73-5. Prof. Mathematics and Astron., Lehigh Univ., '75-'95. Do. Univ. of Penn., '95-8. Prof. Astronomy and Director of Astron. Observatory, U. of Penn., '98-'05. *Upper Darby, Penn.*

†JAMES M. EVERETT. M.D. (Rush Med. Coll.), '77. Physician. *De Kalb, Ill.*

*HORACE HOLMES. U. S. Lake Survey, '74. U. S. Harbor Imp., '75-6. Asst. Engr. M. C. R. R., '82. Civil Engr. Died Dec. 4, 1902.

*JULIAN S. HULL. Engr. Natl. Bd. Underwriters, '74-5. Asst. Engr. N. P. R. R., '75-7. Do. D. & R. G. R. R., '77-'80. Asst. Chief Engr. Tex. S. F. & No. R. R., '80-2. Div. Engr., Mexican Central R. R., '82-5. Contractor's Engr., '85-9. Chief Engr. Deadwood Black Hills R. R., '87-9. Asst. Chief Engr. Chilian Ry's, '89-'90. Div. Engr. U. P. R. R. Engr. Sanitary Dist. Chicago, '93-9. Died at Chicago, Ill., Dec. 9, 1905.

†HENRY B. JACKSON. Asst. Engr. R. R. Loc. and Const., '76. Foreman Billet Mill, Ill. Steel Co. *Joliet, Ill.*

VICTOR H. LANE. LL.B., '78. U. S. Lake Survey, '72-4. Judge of First Judicial Circuit of Mich., '88-'97. Prof. Dept. of Law, U. of M., '97 to date. *715 Forest Ave., Ann Arbor, Mich.*

†CHARLES M. LUNGREN. Editorial Staff *Baltimore Gazette and Pop. Science Monthly*. Experimental Engineer. *New York, N. Y.*

†JAMES L. RUMSEY. U. S. Rep. Surveyor Oregon, '76-7. Do. '81-5. Supt. of Const. Oregonian R. R., '78-'82. Civil Engineer. *Grand Rapids, Mich.*

LEVI L. WHEELER, (Civil). M. Am. Soc. C. E. U. S. Asst. Engr. Lake Survey, '74-'81. Do. Miss. River Com., '82-'87. Do. Waterway, Lake Mich. to Ill. River, '88-'90. Do. Ill. and Miss. Canal, '91 to date. *703 Second Ave., Sterling, Ill.*

*ROBERT E. WILLIAMS. A.B. (Yale) '71. Water Wks. Dealer in R. R. and Shipping Supplies. Died at Hartford, Ct., 1887.

*ORRIN S. WILSON. U. S. Asst. Engr. No. Boundary Survey, '73-7. Do. Dept. of Texas, '77-'84. Asst. Engr. N. Y. State Survey, '77-'84, '86-7. Engr. N. Y. State Bd. of Health, '84-6. Bldg. Supt. and Engr. State Hospital, '87-'94. Asst. Engr. Erie Canal Impts., '96-8. Died at Buffalo, January 21, 1899.

LEVI D. WINES. U. S. Lake and Mo. River Surveys. Prof. Math Ann Arbor High School. *Ann Arbor, Mich.*

1875.

Albert L. Arey. M. Am. Assoc. Adv. Sci., Am. Chem. Soc., Am. Physical Soc. Overseer, Fox & Wisconsin Riv. Imp't, '75-6. Div. Engr. C. M. & St. P. R. R., '77-8. U. S. Asst. Engr. Miss. Riv. Imp't, '78. Engr. in charge Const'n Gt. N. R. R., '79-'80. Prof. Physics, Cleveland High School, '80-4. Head Master Physical Sci., Rochester High School, '85-'00. Prof. of Chem., Rochester Mechanics Inst., '69-'00. First Asst. Girls' High School, New York City, '00 to date. Director, "Natural Sci. Camp," '90 to date. Author of a Laboratory Manual in Physics, '90, also Elementary Chemistry, '00.
1076 Bergen St., Brooklyn, N. Y.

Lucius Baker. Asst. Engr. L. M. & B. R. R., '75-6. Teaching, Lafayette, Ind., '76-7. Supt. Schools, Owosso, '77-8. Mfgr. Petoskey, '71-'81. Teaching Math., Berkeley, Cal., '81-2. Asst. Engr. C. P. R. R., '82. Asst. in U. S. Magnetic Observatory, Los Angeles, '83. Surveyor, '83-7. Raisin Grower, '85 to date.
R. F. D., No. 4, Fresno City, Cal.

***Charles C. Baldwin.** U. S. Mineral Surveyor, Leadville, Colo., '75-'86. Died at Leadville, November, 1886.

***Henry D. Bates.** U. S. Mineral Surveyor, Leadville, Colo. Mngr. of Bates Mining Co. Civil and Mining Engr. Died at Weiser, Idaho, December, '99.

***Ben Birdsall, Jr.** Lumbering, John A. McGraw, '75-'92. Supt. Vermilion Lumbering Co., Three Rivers, Can., '92-5. Died at Montreal, P. Q., October, '95.

†Charles L. Buckingham. LL.B. (Columbian Univ.), '80. Asst. Exam. U. S. Patent Office, '76-'80. Counsel W. U. Tel. Co., Thompson, Houston, Gen. Electric and other Cos.
New York, N. Y.

***Charles A. Carnefix.** Teacher. Died at Rock City, Ill., June, 1889.

Rolla C. Carpenter. M.S. (Mich. Agr. Coll.), '76. M.M.E. (Cornell Univ.), '88. M. Am. Soc. M. E., do. Am. Inst. Min. Engr., do. Am. Soc. Heating & Ventilating Engrs., N. Y. R. R. Club, Engineers' Club, do. Mich. Engr. Soc. Author of "Experimental Engineering," "Heating and Ventilating Buildings," and papers in various proceedings of Engr. Soc. Instructor in Mich. Agr. Coll., '76-8. Prof. Engr. and Math. Mich. Agr. Coll., '78-'90. Prof. Exp. Engr., Cornell Univ., '00-'05. Asst. Engr. Detroit & Bay City R. R. (now branch M. C. R. R), '95-6. Consulting Engr. for various works of which a few are stated. Lansing Iron Wks., '80-'90. Cortland St. R. R., '95-6. Ithaca St. R. E., '96 to date. Apple River Dam, '98-9. Helderburg Cement Co., '99-'01. Great Northern Portland Cement Co., '01-'04. Remington Typewriter Co., '03-4. Kosmos Portland Cement Co., '04-5. Ontario Power Co., Niagara Falls, '05. Miss. Valley Portland Cement Co., '05-6. Mem. of Jury of Awards, World's Fair, Chicago, '93. Pan-American Exhibition, Buffalo, '01.
125 Eddy St., Ithaca, N. Y.

Leman L. Dickinson. Fruit Grower
R. F. D. No. 4, Grand Rapids, Mich.

*J. Clement Eaton. U. S. Lake Survey, '76-9. Died at Tecumseh, Mich., February, 1881.

Emerson W. Grant. Am. Soc. C. E. Rodman and Topographer, Mo. and Miss. River Surveys, '79-'80. Rodman A. T. & S. F. Ry., '80. Transitman, do., '80-3. Res. Engr. do., '83-6. Asst. Engr. do., '86-7. Res. Engr. (Const'n) do., '87-88. Office Engr. (Const'n) Ft. Wayne & Rio Grande Ry., '89-'90. Loc. Engr. R. R. Surveys, Cal., '90. Min. and Topographical Surveys, Argentine Smelting and Refining Co., Mex., '91-2. Res. Asst. and Loc. Engr. A. T. & S. F. Ry., '92-5. Asst. Engr. Ill, Mo. & New Mex. Div'n A. T. & S. F. Ry., '95-8. Res. Engr. New Mex. Div'n, do., '98-'00. Loc. Engr., do., '00-'02. Asst. Engr. in office of Chief Engr., do., '02-'06.
2407 Topeka Ave., R. F. D. No. 2, Topeka, Kansas.

Joseph Warren Hoover. M. Am. Soc. C. E. Engr. Indianapolis Bdge. Co., '75-7. Eng. of Const. W. I. Bdge. Co., Canton, O., '78-'84. Bdge. Engr. and Gen'l Agt. Wrought Iron Bdge. Co., Kansas City, '84-'00. Contracting Mngr. Am. Bdge. Co. at Kansas City, '00-2. Gen'l Agt. Canton Bdge Co. at Kansas City, '02 to date. *514 New York Life Bldg., Kansas City, Mo.*

*John H. Morrison. U. S. Asst. Engr. N. & N. W. Lake Survey. Do. Miss. Riv. Surv. and Imp. Asst. Engr. P. Ft. W. & C. R. R.; C. R. I. & P. R. R.; St. P. M. & M. R. R. Civ. Engr., St. Paul, Minn. Real Estate. Died at Columbus, O., January 7, 1897.

†Martin L. Newton. Principal High Sch., LaPorte, Ia., '76-8 and '83-5. Chf. Engr. D. I. & D. Ry., '87-8. Do. W. & C. F. Rapid Transit Co., '96. City Engr. and Co. Surveyor, '89.
Waterloo, Ia.

*George E. Pantlind. LL.B., '78. Lumber Dealer, Grand Rapids. Died at Chicago, March, 1896.

†Edward I. Parsons. Supt. Schools, Huron, O., '76-'80. Mining and Min. Surv., '80-3. Const. Engr. Pacific Cable Const. Co., '83-'90. Civil Engineer. *332 Bay St., San Francisco, Cal.*

William H. Potter. Asst. Engr. Penna. Co., '75-'80. Gen'l Rd. Master, Penna. Co., '80-3. Engr. Maintenance of Way, Penna. Co., '83-'95. Supt. Penna. Co., '95-'03. V. Pres't Cherry Valley Iron Wks., '96-8. Pres't do., '98-'01. Mfg., '03 to date.
532-534 West 22nd St., New York City, N. Y.

†Edgar D. Root. Asst. to City Engr., Jackson, Mich., '76. Clerk M. C. R. R. and Blue Line. *Medinah Bldg., Chicago, Ill.*

Walter S. Russel. M. Am. Soc. M. E. and V. Pres't, '98. M. Am. Inst. Min. E., do. Detroit Engr. Soc. and its first Pres't. M. Mich. Engr. Soc. Pres't and Gen'l Mngr. Russel Wheel & Foundry Co., '80 to date.
Russel Wheel & Foundry Co., Detroit, Mich.

†Marcus J. Wells. Co. Surveyor. City Engr. U. S. Asst. Engr. Riv. Imp. Div. and Loc. Engr. R. R. *Woodston, Kan.*

1876.

Dewitt C. Allen. Surveyor and Farmer. *Cattaraugus, N. Y.*

James O. Caldwell. Prin. Salem Acad., O., '77 and '84-6. Prof. Math. and Astronomy, Wilmington College, O., '87-'90. Prin. Fountain School, Pueblo, Colo., '90-5. U. S. Deputy Mineral Surveyor, Dist. of Colo., '96 to date. *1321 E. Ninth St., Pueblo, Colo.*

*Frank P. Davis. M.S. (Mich. Agr. Coll.), '72. M. Am. Soc. C. E. Loc. and Const. Engr., C. M. & M. R. R., '70-4. Draftsman, Washington, '79-'81. Res. Engr., D. & Rio Grande W. R. R., '81. Loc. Engr., Rocky Mt. Div. Can. Pac. R. R., '82-3. Asst. Engr., Dist. Columbia, '84-8. Asst. and Div. Engr. Nicaragua Ship Canal, '88-'93. Chief Asst. Engr., Nicaragua Canal Com., '95. Engr., R. R. Const. and Sanitary Wks., Costa Rica. Asst. Engr., U. S. Deep Waterways Com. Died at Posoya, Ecuador, May, 1900.

*Lewis C. Donaldson. U. S. Lake Survey, '72-4. Died at Macon, Ill., April, 1877.

*Charles A. Marshall. M. Am. Soc. C. E. Bridge Dept. Edge Moor Iron Co., '76-'80. Const. Engr., Cambria Iron Co., '81-4. Engr. of Tests, C. I. Co., '84-9. Drowned in Johnstown Flood, May, 1889.

Joseph Ripley. M. Am. Soc. C. E., do. Western Soc. of Engrs., do. Mich. Engr. Soc., do. Consulting Board of Engineers Panama Canal, Aug. '05-Feb. '06. Surveyor, Chippewa Co., '76-7. U. S. Asst. Engr., St. Mary's River, '77-'06. U. S. Asst. Engr. Survey Birmingham Canal, Ala., '97. Gen'l Supt. St. Mary's Falls Canal, '98-'06. *334 Portage Ave., Sault Ste. Marie, Mich.*

†John D. Sanders. Teaching, '76-7. D'ftsman and Asst. Insp. Edge Moor Iron Works, '77-8. Asst. Supt., Mine La Motte Lead Mines and Wks., '78-9. Supt. do. '79-'97. Asst. Mgr. Solvay Process Co., Detroit, '97 to date. *Detroit, Mich.*

John M. Schaeberle. M.S. (Hon. U. of M.), '93, LL.D. (Univ. of Cal.), '98. Private Asst. to Prof. Watson (U. of M.), '76-8. Asst. in Observatory, U. of M., '78-'85. Acting Asst. Prof. Astron., '85-6. Instructor do., '86-8. Astronomer, Lick Observatory, Cal., '88-'97. Acting Director, '97-8. Astronomical Investigator. *502 Second St., Ann Arbor, Mich.*

†Jonathan C. Shepard. Engr., U. P. R. R., '76-'81. Do. U. S. River Imp. Civil Engineer. *Escondido, Cal.*

Lester H. Strawn. Attorney at Law. *Ottawa, Ill.*

*Alonzo J. Tullock. M. Am. Soc. C. E. Engr. and Proprietor, Mo. Valley Bridge and Iron Works. Died at Leavenworth, Kan., July 19, 1904.

1877.

Osmer H. Aikine. M. Mich. Engr. Soc. First Asst. Engr., M. P. G. & D. R. R., '80. Div. Engr., B. M. R. R. in Neb., '87. Asst. Gen'l Mngr., Magna Charta Silver Min. and Tunnel Co., '91-3. U. S. Dep. Mineral Surveyor, '79 to date. Mining Engr., the Raymond Consolidated Mines Co., '03 to date. *Gunnison, Colo.*

Holland W. Baker. M. Am. Soc. C. E. U. S. Asst. Engr., Miss. and Mo. River Imp. Civ. Engineer. *Kirkwood, Mo.*

William Burton. A.B. (Iowa Coll.), '75. A.M. (Iowa Coll.), '80. U. S. Dep. Surveyor, Co. Surveyor and Notary Public. *Garden Valley, Eldorado Co., Cal.*

†Benjamin C. Richards, (Civil).

Edward J. Snover. Treas., Owen & Co., Ltd., from '02 to date. *529 Third Ave., Detroit, Mich.*

†James E. Turtle. U. S. Asst. Engr. Riv. Imp., '77-8. Do. Muscle Shoals Canal, '79-'82. Do. Miss. Riv. Imp., '83-6. Do. Harbor Imp. and Imp. of Rivers in Fla. and Ala. *Warrington, Fla.*

1878.

*Walter S. Abel, (Mining). Assay Office, San Francisco. Died at San Francisco, May, 1887.

George F. Allmendinger. Farmer, '79-'82. Mngr., Central Milling Co., '83-'00. Mngr., Delhi Mills, '85-6. Mngr., A. A. Milling Co., '92-7. Sec'y and Treas., Mich. Milling Co., '00 to date. Pres't Mich. State Millers' Assn., '00-'01. *1035 S. Main St., Ann Arbor, Mich.*

*Clarence O. Arey. M.D. (Univ. of Pa.). In Charge Bacteriological Lab., Gov. Exp. Sta., '93. Architect. Died at Cleveland, O., August, 1896.

James D. DuShane. U. S. Asst. Engr. in Charge of Miss. River Imp. from St. Paul to Mo. River, '78 to date. *Federal Bldg., St. Paul, Minn.*

Wm. V. Grove. D.D.S. (Ohio Coll.), '81. Dentist. *610 Ellicott Square, Buffalo, N. Y.*

†John K. Hanson. Civil Engineer. *Concord, Neb.*

*John B. Johnson. M. Am. Soc. C. E. Do. Am. Soc. Mech. E. U. S. Asst. Engr., Lake Survey, '78-'80. Do. Miss. Riv. Com., '80-3. Prof. Civ. Eng., Wash. Univ., '85-'99. Dean Dept. Mech. and Eng., Univ. of Wis. Deceased.

Timotheus Josenhans. Architect. *Seattle, Wash.*

Henry W. Judd, (Mining). Banker for 22 years. At present, Broker. Mem. Cleveland Stock Exchange. *The St. Regis, Euclid Ave., Cleveland, O.*

Eugene G. Mann, (Mining). Druggist. *213 S. Main St., Ann Arbor, Mich.*

Seymour T. Morse, (Civil). A.B. (U. of M.), '01. Farming and Teaching. Also Insurannce Solicitor.
1025 Vaughn St., Ann Arbor, Mich.

Charles F. Owen. Chief Engr. on Steamboat, '78-'82. Engr., Harrison St. Pumping St. *6618 Drexel Ave., Chicago, Ill.*

*****James Sanderson.** Asst. Engr., T. & A. A. R. R. Died at Bay City, Mich., September, 1885.

Ossian C. Simonds. M. Western Engr. Soc. Supt., Graceland Cemetery, '80-'03. Landscape Gardener do., '80-'05. Mem. Bd. of Mngrs. do., '00-'06. Landscape Gardener, O. C. Simonds & Co., '02-'06. *Buena Ave., Chicago, Ill.*

Frank L. Sizer. M. Montana Soc. of Engrs., do. Am. Inst. of Min. E., do. Nat'l Geographic Soc., do. Geological Soc. of Washington. D'ftsman, U. S. Survey Gen'l, Colo., '80-1. Chf. Clerk, U. S. Survey Gen'l, Mont., '82-3. Gen'l Mngr., Empire Min. Co., '86-8. Gen'l Mngr., Helena Pressed Brick Co., '88-'90. Chief of Office Irrigation Inquiry, Dept. of Agrl., Washington, D. C., '93. Chf. Min. Engr. for W. A. Clark, Butte, Mont., '98-'01. Gen'l Mngr., Rosario Mines, Mexico, '01-3. Do. Mo. and Mont. Gold Mng. Co., '03-4. Do. Whitlatch Mng. Co., '04 to date. Mngr., Eclipse-Argo Mining Co., July, '05 to date. Consulting Engr., Gould Mines Co., Mar., '06 to date. Do. Iron Mt. Tunnel Co., Jan., '06 to date.
731 Stuart St., Helena, Mont.

Hiram E. Terry. M. Mich. Eng. Soc. Co. Surveyor, '79-'80. Asst. Engr., D. L. & N. R. R., '81. Prin. Sch. Maple Rapids, '81-3. Do. Central Sch. E. Saginaw, '84-9. Asst. City Engr., Saginaw, '89-'96. City Engr. do., '96-'02. Civil Engineer, '02 to date.
721 Holland St., Saginaw, Mich.

†**Evert VanPelt.** Engr., Leavenworth & Topeka R. R. Civ. Engr.
Yoakum, Tex.

Andrew J. Wenzell, (Civil). Insp. and Asst. Engr., U. S. Rivers and Harbors, '78-'84. Asst. Engr., M. C. R. R., P. M. R. R., '84-7. Engr., Detroit Belle Isle Bdge., '88-'90. Div. Engr., C. M. & St. P. Ry., '87-8. Asst. Engr., G. R. & I. R. R., '90-2. Ch. Engr., L. S. & I. Ry., '92-3. Do. D. & M. R. R., '94-5. Contractor and miscell., '95-'00. Ch. Engr., Southern Ill., '00-1. Locating Engr., Mo. Pacific, Pere Marquette, '02-4. Consulting Engr., '04-6. Consulting Engr., Gabriel Concrete Steel Co., '06.
81 Marston Ct., Detroit, Mich.

†**Sidney B. Wight**, (Mining). Assayer and Chemist, Wyandotte Silver Works, '78. Do. Detroit and Lake Superior Copper Works, '79-'82. Do. Vulcan Ice Co., Newberry, '82-6. Supt. Land Dept., D. M. & M. R. R. and Peninsular Land Co., '86-'91. Secy. to Prest., M. C. R. R. Asst. Purchasing Agt., M. C. R. R.
786 Congress St. E., Detroit, Mich.

OTTO J. KLOTZ, (Civil). L.L.D. (Univ. of Toronto), '04. F. of the Royal Astron. Soc. Do. of the Am. Assoc, for the Adv. of Sci. Hon. M. New Zealand Inst. M. Washington Acad. of Sci. Do. Nat'l Geog. Soc. Do. Canadian Inst. Private Practice, '72-8. Field Astronomer, Dept. of Interior, Canada, '85. Alaska Boundary Survey, '93-4. First astronomic longitude girdle round the world, '03. Magnetics, Gravity, Seismology. Astronomer for Dominion Gov't. *437 Albert St., Ottawa, Canada.*

JOHN A. MITCHELL. M. Mich. Engr. Soc. Asst. Engr. J. L. & S. R. R., '72-3. City Engr. and County Surveyor, Ludington, '74-5. U. S. Asst. Engr. River and Harbor Works, East Shore, Lake Mich., '77-'93. Civ. Engr. and Contractor, '93-'05. *Ludington, Mich.*

THOMAS O. PERRY, (Civil). B.A., '69. Engr. U. S. Wind Eng. and Pump Co. and Eclipse Wind Eng. Co., '76-'83. Airmotor Co., Chicago, '87-'97. Invented "Aermotor," '82-3. Inventor and Mfgr. Work more in the nature of Mech. rather than Civ. Engr. Time unaccounted for has been given to experimental work, especially with pumps and windmills. Results of some experiments with windwheels were published in Water Supply and Irrigation Paper, No. 20, by the U. S. Geological Survey Dept. *5328 Prairie Ave., Chicago, Ill.*

EDMUND M. SPALDING. Engr. R. R.'s in No. Mich., '72-8. U. S. Asst. Engr. River and Harbor Imp., Yellowstone River and Superior and Dutluth Harbors, '78-'80. R. R. Loc. and Const. Engr., '80-'90. Civil and Consulting Engr., private practice, Milwaukee, '90-'05. Chief Engr., Milwaukee Southern Ry., Milwaukee. *106 Mason St., Milwaukee, Wis.*

MARVIN F. TEMPLE. Levelman, J. L. & S. R. R., '72-3. Teaching and business, '74-81. Asst. Engr. A. T. & S. F. R. R., in N. Mex., '81-2. Asst. Engr. in Gen'l Office. A. T. & S. F. R. R., '82-5. Asst. Engr. B. & M., Surveyor, '85. Div. Engr. C. B. & N. R. R. (Wis. and Minn.), '85-6. Div. Engr. A. T. & S. F. R. R. and C. S. F. and C. R. R. (Kans. and Mo.), '86-8. Asst. Engr. U. P. R. R. (Wyoming), '89. Asst. Engr. G. C. & S. F. Ry. (Texas and I. T.), '90-2. Res. Engr. G. C. & S. F. Ry. (Texas and I. T.), '92-3. Private practice and City Engr., Temple, '94-7. Asst. Engr. G. C. & S. F. Ry., '97-'01. Chief Engr. G. B. & K. C. and G. B. & G. N. Rys., '01-'03. Res. Engr. G. C. & S. F. Ry., '03-'04. Res. Engr. and Chief Engr. G. C. & S. F. R. R. (Jasper and Eastern construction) at present time. *Beaumont, Texas*

MATTHEW TSCHIRGI, JR., (Civil). M. Ia. Soc. C. E. Co. Surveyor, Dubuque Co., Ia., '76-'91. City Engr., Dubuque, '77-'91. Pres't Dubuque Construction Co., '91-'98. Consulting Engr., '98-'06. *46 Henion St., Dubuque, Ia.*

Samuel F. Beaumont, (Mining). Civil and Mining Engineer. *St. Louis, Mo.*

Edward S. Davis. U. S. Asst. Engr., Miss. Riv. Surveys, '80-3. Co. Surveyor, Hill Co., Texas, '79-'96. *Hillsboro, Tex.*

George L. Fisher. Architect. *Omaha, Neb.*

Cicero D. Hill. M. Western Soc. of Engrs. Asst. Engr., C. M. & St. P. R. R. Do. D. & R. G. R. R. Do. Hennepin Canal. Do. Dept. Pub. Wks., Chicago. Chief Engr. Sewers, Bd. Local Improvements, Chicago, '98-'06. *808 Farwell Ave., Chicago, Ill.*

†**Frank P. Satterlee**, (Mining). Assayer. Medical Student, '99. *San Francisco, Cal.*

1881.

George A. Brown. M. Ill. Assoc. of C. E. and Surveyors. Instrument man, P. McK. & Y. R. R., '81-2. Res. Engr., T. H. & L. R. R., '82-3. Junior Mem. of Engr. Firm, C. C. & G. A. Brown, '83-5. Asst. Engr., S. P. Co., '86-'9. U. S. Asst. Engr. (Irrigation Wk.), '89. Senior Mem. Engr. Firm, Brown & McCullough, '90-6. Secy. and Mngr., Public School Pub. Co., '97 to date. *1111 North Prairie St., Bloomington, Ill.*

†**Randolph W. Brown.** Merchant. *Rochester, (?) Minn.*

†**John W. Dorst.** Asst. Engr., D. & R. G. R. R., '81. U. S. Asst. Engr., Miss. Riv. Com., '81-5. Manufacturer. *863 Columbus Ave., New York, N. Y.*

William W. Follett. M. Am. Soc. C. E. Div. Engr., N. O. & N. E. R. R., '81-3. Engr. in Charge Red Riv. Bridge, Shreveport, La., '83-5. Div. and Loc. Engr., A. T. & S. F. R. R., '86-'88. Div. Engr., Irrigation Survey and U. S. Geological Survey, '89-'90. Asst. Engr., Artesian and Underflow Investigation, '90-1. Various Positions, '92-'96. Cons. Engr., International (Water) Bndry. Com. U. S. and Mexico, '97-'00 and '02 to date. *El Paso, Tex.*

John E. Hathaway. Contractor. *106 Mason St., Milwaukee, Wis.*

†**David E. Hoover.** Engr. Sanitary Dept., Pullman, Ill., '81. Asst. Engr., Mex. Central R. R., '82. Surveyor and Vineyardist. *Keuka, N. Y.*

***George A. Lederle.** M. Am. Soc. C. E. Asst. Engr., Bismark Bridge, '81-'2. Do. Snake River Bridge, '82-3. Engr. in Charge Keithsburg Bridge, '85. Res. Engr., Omaha Bridge, '86. Do. Williamette Bridge, '87. Do. Snake River Bridge, '88. Civil Engineer and Contractor, Firm of Christie and Lawe. Died March 27, 1905.

†**George W. Lilly.** A.B. (Ohio Wesl.). Asst. Engr., Pullman, Ill., '81. Do. W. & L. E. R. R. Bdge., Toledo, '81. Do. S. C. & P. R. R. Bdge. over Mo. Riv., '82-4. Do. Queen and Crescent Ry. and private practice, '83-5. Legislature N. Dak., '89-'90. Atty. at Law, Ashley, N. Dak., '84-'95. Asst. City Engr., Columbus. *216 E. Eleventh Ave., Columbus, O.*

OTTO J. KLOTZ, (Civil). L.L.D. (Univ. of Toronto), '04. F. of the Royal Astron. Soc. Do. of the Am. Assoc, for the Adv. of Sci. Hon. M. New Zealand Inst. M. Washington Acad. of Sci. Do. Nat'l Geog. Soc. Do. Canadian Inst. Private Practice, '72-8. Field Astronomer, Dept. of Interior, Canada, '85. Alaska Boundary Survey, '93-4. First astronomic longitude girdle round the world, '03. Magnetics, Gravity, Seismology. Astronomer for Dominion Gov't. *437 Albert St., Ottawa, Canada.*

JOHN A. MITCHELL. M. Mich. Engr. Soc. Asst. Engr. J. L. & S. R. R., '72-3. City Engr. and County Surveyor, Ludington, '74-5. U. S. Asst. Engr. River and Harbor Works, East Shore, Lake Mich., '77-'93. Civ. Engr. and Contractor, '93-'05. *Ludington, Mich.*

THOMAS O. PERRY, (Civil). B.A,. '69. Engr. U. S. Wind Eng. and Pump Co. and Eclipse Wind Eng. Co., '76-'83. Airmotor Co., Chicago, '87-'97. Invented "Aermotor," '82-3. Inventor and Mfgr. Work more in the nature of Mech. rather than Civ. Engr. Time unaccounted for has been given to experimental work, especially with pumps and windmills. Results of some experiments with windwheels were published in Water Supply and Irrigation Paper, No. 20, by the U. S. Geological Survey Dept. *5328 Prairie Ave., Chicago, Ill.*

EDMUND M. SPALDING. Engr. R. R.'s in No. Mich., '72-8. U. S. Asst. Engr. River and Harbor Imp., Yellowstone River and Superior and Dutluth Harbors, '78-'80. R. R. Loc. and Const. Engr., '80-'90. Civil and Consulting Engr., private practice, Milwaukee, '90-'05. Chief Engr., Milwaukee Southern Ry., Milwaukee. *106 Mason St., Milwaukee, Wis.*

MARVIN F. TEMPLE. Levelman, J. L. & S. R. R., '72-3. Teaching and business, '74-81. Asst. Engr. A. T. & S. F. R. R., in N. Mex., '81-2. Asst. Engr. in Gen'l Office, A. T. & S. F. R. R., '82-5. Asst. Engr. B. & M., Surveyor, '85. Div. Engr. C. B. & N. R. R. (Wis. and Minn.), '85-6. Div. Engr. A. T. & S. F. R. R. and C. S. F. and C. R. R. (Kans. and Mo.), '86-8. Asst. Engr. U. P. R. R. (Wyoming), '89. Asst. Engr. G. C. & S. F. Ry. (Texas and I. T.), '90-2. Res. Engr. G. C. & S. F. Ry. (Texas and I. T.), '92-3. Private practice and City Engr., Temple, '94-7. Asst. Engr. G. C. & S. F. Ry., '97-'01. Chief Engr. G. B. & K. C. and G. B. & G. N. Rys., '01-'03. Res. Engr. G. C. & S. F. Ry., '03-'04. Res. Engr. and Chief Engr. G. C. & S. F. R. R. (Jasper and Eastern construction) at present time. *Beaumont, Texas*

MATTHEW TSCHIRGI, JR., (Civil). M. Ia. Soc. C. E. Co. Surveyor, Dubuque Co., Ia., '76-'91. City Engr., Dubuque, '77-'91. Pres't Dubuque Construction Co., '91-'98. Consulting Engr., '98-'06. *46 Henion St., Dubuque, Ia.*

Robert S. Woodward. Hon. Ph.D. (U. of M.), '92. Hon. LL.D. (U. of W.), '04. Hon. Sc.D. (U. of Pa. and Columbia Univ.), '05. Asst. Engr. U. S. Lake Survey, '72-'82. Asst. Astron. U. S. Transit of Venus Com'n, '92-4. Astron., Geographer, and Chief Geographer, U. S. Geolog. Survey, '84-'90. Asst. U. S. Coast and Geodetic Survey, '90-3. Prof. Mechanics and Mathematical Physics, Columbia Univ., '93-'05. Dean, School of Pure Sci., Columbia Univ., '95-'05. Pres. Carnegie Institution of Washington, '05.
Carnegie Institution of Washington, Washington, D. C.

1873.

Frank E. Bliss. LL.B., '79. Civ. Engr., '73-5. Atty. at Law.
Cleveland, O.

John H. Darling. M. Am. Soc. C. E. Asst. Engr. Lake and Miss. Riv. Survey, '73-'82. Do. U. S. Harbor Imp., '83 to date. Principal Asst. Engr. River and Harbor Imp., Lake Superior Dist.
532 W. Third St., Duluth, Minn.

Thomas Emery. Architect and Builder, '73-'93. Lumberman and Mfgr. to date. *630 S. Weadock St., Saginaw, Mich.*

***Edwin J. Ferdon.** Lumber Trade, '77-'81. Died at Detroit, November, 1881.

Frank W. Guernsey, (Civil). Co. Surveyor, '73-'81. Co. Supt. Sch. Plymouth Co., Ia., '78-'80. Cash. Nat. Bank, '90-8. Co. Treas., '98-'02. Asst. Cash. Garfield Co. Bank, '04-'05. At present in real estate business (Guernsey & Peabody) and surveying.
Dayton, Washington.

William J. Head, (Civil). Sturgeon Bay and Lake Mich. Ship Canal, '71-2. Secy. and Treas. Ferd. Heim Brewing Co., Kansas City, Mo., '72-6. Mngr. George Bullen & Co., Malsters, Chicago, '93-'04. At present Vice Pres't Winona Malting Co., Winona, Minn. *87 Rush St., Chicago, Ill.*

***Joseph W. Perkins.** Chf. Dftsman Bldg. Dept. A. T. & S. F. R. R. '87-9. Architect, '89-'96. Asst. State Archt. Kan., '92-4. Archt. City of Mexico, '96. Died Feb. 27, 1905.

†Clarence M. Stevens. Co. Surveyor. Asst. Supt. Yellowstone Park. Dept. U. S. Mineral Surveyor. City Engr.
Mt. Clemens, Mich.

†William Voight, Jr. U. S. Asst. Engr. Lake Survey. City Engr. Detroit. Asst. Engr. A. T. & S. F. R. R., '76-'83. Sec. and Treas. Home Brewing Co. *661 St. Aubin Ave., Detroit, Mich.*

†Josiah W. Willis. U. S. Lake Survey, '71. With Bay City *Chronicle*, '73. Contractor and Builder, '73-4. Prin. of School, Bay City, '74-5. Prin. of Pub. Sch. 48, Buffalo, '78-'99.
47 12th St., Buffalo, N. Y.

***Chas. M. Winchell.** U. S. Asst. Engr. Lake Survey, '74-8. Do., Miss. Riv. Com., '78-'85. '88-'95. Do. Surveys of Pass Cavallo and Arkansas Pass, Tex., '86-7. Engr. Street Dept. St. Louis, '96. U. S. Asst. Engr. Died May 8, 1904.

LEMAN L. DICKINSON. Fruit Grower
R. F. D. No. 4, Grand Rapids, Mich.

*J. CLEMENT EATON. U. S. Lake Survey, '76-9. Died at Tecumseh, Mich., February, 1881.

EMERSON W. GRANT. Am. Soc. C. E. Rodman and Topographer, Mo. and Miss. River Surveys, '79-'80. Rodman A. T. & S. F. Ry., '80. Transitman, do., '80-3. Res. Engr. do., '83-6. Asst. Engr. do., '86-7. Res. Engr. (Const'n) do., '87-88. Office Engr. (Const'n) Ft. Wayne & Rio Grande Ry., '89-'90. Loc. Engr. R. R. Surveys, Cal., '90. Min. and Topographical Surveys, Argentine Smelting and Refining Co., Mex., '91-2. Res. Asst. and Loc. Engr. A. T. & S. F. Ry., '92-5. Asst. Engr. Ill, Mo. & New Mex. Div'n A. T. & S. F. Ry., '95-8. Res. Engr. New Mex. Div'n, do., '98-'00. Loc. Engr., do., '00-'02. Asst. Engr. in office of Chief Engr., do., '02-'06.
2407 Topeka Ave., R. F. D. No. 2, Topeka, Kansas.

JOSEPH WARREN HOOVER. M. Am. Soc. C. E. Engr. Indianapolis Bdge. Co., '75-7. Eng. of Const. W. I. Bdge. Co., Canton, O., '78-'84. Bdge. Engr. and Gen'l Agt. Wrought Iron Bdge. Co., Kansas City, '84-'00. Contracting Mngr. Am. Bdge. Co. at Kansas City, '00-2. Gen'l Agt. Canton Bdge Co. at Kansas City, '02 to date. *514 New York Life Bldg., Kansas City, Mo.*

*JOHN H. MORRISON. U. S. Asst. Engr. N. & N. W. Lake Survey. Do. Miss. Riv. Surv. and Imp. Asst. Engr. P. Ft. W. & C. R. R.; C. R. I. & P. R. R.; St. P. M. & M. R. R. Civ. Engr., St. Paul, Minn. Real Estate. Died at Columbus, O., January 7, 1897.

†MARTIN L. NEWTON. Principal High Sch., LaPorte, Ia., '76-8 and '83-5. Chf. Engr. D. I. & D. Ry., '87-8. Do. W. & C. F. Rapid Transit Co., '96. City Engr. and Co. Surveyor, '89.
Waterloo, Ia.

*GEORGE E. PANTLIND. LL.B., '78. Lumber Dealer, Grand Rapids. Died at Chicago, March, 1896.

†EDWARD I. PARSONS. Supt. Schools, Huron, O., '76-'80. Mining and Min. Surv., '80-3. Const. Engr. Pacific Cable Const. Co., '83-'90. Civil Engineer. *332 Bay St., San Francisco, Cal.*

WILLIAM H. POTTER. Asst. Engr. Penna. Co., '75-'80. Gen'l Rd. Master, Penna. Co., '80-3. Engr. Maintenance of Way, Penna. Co., '83-'95. Supt. Penna. Co., '95-'03. V. Pres't Cherry Valley Iron Wks., '96-8. Pres't do., '98-'01. Mfg., '03 to date.
532-534 West 22nd St., New York City, N. Y.

†EDGAR D. ROOT. Asst. to City Engr., Jackson, Mich., '76. Clerk M. C. R. R. and Blue Line. *Medinah Bldg., Chicago, Ill.*

WALTER S. RUSSEL. M. Am. Soc. M. E. and V. Pres't, '98. M. Am. Inst. Min. E., do. Detroit Engr. Soc. and its first Pres't. M. Mich. Engr. Soc. Pres't and Gen'l Mngr. Russel Wheel & Foundry Co., '80 to date.
Russel Wheel & Foundry Co., Detroit, Mich.

1875.

LBERT L. AREY. M. Am. Assoc. Adv. Sci., Am. Chem. Soc., Am. Physical Soc. Overseer, Fox & Wisconsin Riv. Imp't, '75-6. Div. Engr. C. M. & St. P. R. R., '77-8. U. S. Asst. Engr. Miss. Riv. Imp't, '78. Engr. in charge Const'n Gt. N. R. R., '79-'80. Prof. Physics, Cleveland High School, '80-4. Head Master Physical Sci., Rochester High School, '85-'00. Prof. of Chem., Rochester Mechanics Inst., '69-'00. First Asst. Girls' High School, New York City, '00 to date. Director, "Natural Sci. Camp," '90 to date. Author of a Laboratory Manual in Physics, '90, also Elementary Chemistry, '00.
1076 Bergen St., Brooklyn, N. Y.

UCIUS BAKER. Asst. Engr. L. M. & B. R. R., '75-6. Teaching, Lafayette, Ind., '76-7. Supt. Schools, Owosso, '77-8. Mfgr. Petoskey, '71-'81. Teaching Math., Berkeley, Cal., '81-2. Asst. Engr. C. P. R. R., '82. Asst. in U. S. Magnetic Observatory, Los Angeles, '83. Surveyor, '83-7. Raisin Grower, '85 to date.
R. F. D., No. 4, Fresno City, Cal.

CHARLES C. BALDWIN. U. S. Mineral Surveyor, Leadville, Colo., '75-'86. Died at Leadville, November, 1886.

HENRY D. BATES. U. S. Mineral Surveyor, Leadville, Colo. Mngr. of Bates Mining Co. Civil and Mining Engr. Died at Weiser, Idaho, December, '99.

BEN BIRDSALL, JR. Lumbering, John A. McGraw, '75-'92. Supt. Vermilion Lumbering Co., Three Rivers, Can., '92-5. Died at Montreal, P. Q., October, '95.

CHARLES L. BUCKINGHAM. LL.B. (Columbian Univ.), '80. Asst. Exam. U. S. Patent Office, '76-'80. Counsel W. U. Tel. Co., Thompson, Houston, Gen. Electric and other Cos.
New York, N. Y.

CHARLES A. CARNEFIX. Teacher. Died at Rock City, Ill., June, 1889.

OLLA C. CARPENTER. M.S. (Mich. Agr. Coll.), '76. M.M.E. (Cornell Univ.), '88. M. Am. Soc. M. E., do. Am. Inst. Min. Engr., do. Am. Soc. Heating & Ventilating Engrs., N. Y. R. R. Club, Engineers' Club, do. Mich. Engr. Soc. Author of "Experimental Engineering," "Heating and Ventilating Buildings," and papers in various proceedings of Engr. Soc. Instructor in Mich. Agr. Coll., '76-8. Prof. Engr. and Math. Mich. Agr. Coll., '78-'90. Prof. Exp. Engr., Cornell Univ., '00-'05. Asst. Engr. Detroit & Bay City R. R. (now branch M. C. R. R), '95-6. Consulting Engr. for various works of which a few are stated. Lansing Iron Wks., '80-'90. Cortland St. R. R., '95-6. Ithaca St. R. E., '96 to date. Apple River Dam, '98-9. Helderburg Cement Co., '99-'01. Great Northern Portland Cement Co., '01-'04. Remington Typewriter Co., '03-4. Kosmos Portland Cement Co., '04-5. Ontario Power Co., Niagara Falls, '05. Miss. Valley Portland Cement Co., '05-6. Mem. of Jury of Awards, World's Fair, Chicago, '93. Pan-American Exhibition, Buffalo, '01.
125 Eddy St., Ithaca, N. Y.

LEMAN L. DICKINSON. Fruit Grower
R. F. D. No. 4, Grand Rapids, Mich.

*J. CLEMENT EATON. U. S. Lake Survey, '76-9. Died at Tecumseh, Mich., February, 1881.

EMERSON W. GRANT. Am. Soc. C. E. Rodman and Topographer, Mo. and Miss. River Surveys, '79-'80. Rodman A. T. & S. F. Ry., '80. Transitman, do., '80-3. Res. Engr. do., '83-6. Asst. Engr. do., '86-7. Res. Engr. (Const'n) do., '87-88. Office Engr. (Const'n) Ft. Wayne & Rio Grande Ry., '89-'90. Loc. Engr. R. R. Surveys, Cal., '90. Min. and Topographical Surveys, Argentine Smelting and Refining Co., Mex., '91-2. Res. Asst. and Loc. Engr. A. T. & S. F. Ry., '92-5. Asst. Engr. Ill, Mo. & New Mex. Div'n A. T. & S. F. Ry., '95-8. Res. Engr. New Mex. Div'n, do., '98-'00. Loc. Engr., do., '00-'02. Asst. Engr. in office of Chief Engr., do., '02-'06.
2407 Topeka Ave., R. F. D. No. 2, Topeka, Kansas.

JOSEPH WARREN HOOVER. M. Am. Soc. C. E. Engr. Indianapolis Bdge. Co., '75-7. Eng. of Const. W. I. Bdge. Co., Canton, O., '78-'84. Bdge. Engr. and Gen'l Agt. Wrought Iron Bdge. Co., Kansas City, '84-'00. Contracting Mngr. Am. Bdge. Co. at Kansas City, '00-2. Gen'l Agt. Canton Bdge Co. at Kansas City, '02 to date. *514 New York Life Bldg., Kansas City, Mo.*

*JOHN H. MORRISON. U. S. Asst. Engr. N. & N. W. Lake Survey. Do. Miss. Riv. Surv. and Imp. Asst. Engr. P. Ft. W. & C. R. R.; C. R. I. & P. R. R.; St. P. M. & M. R. R. Civ. Engr., St. Paul, Minn. Real Estate. Died at Columbus, O., January 7, 1897.

†MARTIN L. NEWTON. Principal High Sch., LaPorte, Ia., '76-8 and '83-5. Chf. Engr. D. I. & D. Ry., '87-8. Do. W. & C. F. Rapid Transit Co., '96. City Engr. and Co. Surveyor, '89.
Waterloo, Ia.

*GEORGE E. PANTLIND. LL.B., '78. Lumber Dealer, Grand Rapids. Died at Chicago, March, 1896.

†EDWARD I. PARSONS. Supt. Schools, Huron, O., '76-'80. Mining and Min. Surv., '80-3. Const. Engr. Pacific Cable Const. Co., '83-'90. Civil Engineer. *332 Bay St., San Francisco, Cal.*

WILLIAM H. POTTER. Asst. Engr. Penna. Co., '75-'80. Gen'l Rd. Master, Penna. Co., '80-3. Engr. Maintenance of Way, Penna. Co., '83-'95. Supt. Penna. Co., '95-'03. V. Pres't Cherry Valley Iron Wks., '96-8. Pres't do., '98-'01. Mfg., '03 to date.
532-534 West 22nd St., New York City, N. Y.

†EDGAR D. ROOT. Asst. to City Engr., Jackson, Mich., '76. Clerk M. C. R. R. and Blue Line. *Medinah Bldg., Chicago, Ill.*

WALTER S. RUSSEL. M. Am. Soc. M. E. and V. Pres't, '98. M. Am. Inst. Min. E., do. Detroit Engr. Soc. and its first Pres't. M. Mich. Engr. Soc. Pres't and Gen'l Mngr. Russel Wheel & Foundry Co., '80 to date.
Russel Wheel & Foundry Co., Detroit, Mich.

†Marcus J. Wells. Co. Surveyor. City Engr. U. S. Asst. Engr. Riv. Imp. Div. and Loc. Engr. R. R. *Woodston, Kan.*

1876.

Dewitt C. Allen. Surveyor and Farmer. *Cattaraugus, N. Y.*

James O. Caldwell. Prin. Salem Acad., O., '77 and '84-6. Prof. Math. and Astronomy, Wilmington College, O., '87-'90. Prin. Fountain School, Pueblo, Colo., '90-5. U. S. Deputy Mineral Surveyor, Dist. of Colo., '96 to date. *1321 E. Ninth St., Pueblo, Colo.*

*Frank P. Davis. M.S. (Mich. Agr. Coll.), '72. M. Am. Soc. C. E. Loc. and Const. Engr., C. M. & M. R. R., '70-4. Draftsman, Washington, '79-'81. Res. Engr., D. & Rio Grande W. R. R., '81. Loc. Engr., Rocky Mt. Div. Can. Pac. R. R., '82-3. Asst. Engr., Dist. Columbia, '84-8. Asst. and Div. Engr. Nicaragua Ship Canal, '88-'93. Chief Asst. Engr., Nicaragua Canal Com., '95. Engr., R. R. Const. and Sanitary Wks., Costa Rica. Asst. Engr., U. S. Deep Waterways Com. Died at Posoya, Ecuador, May, 1900.

*Lewis C. Donaldson. U. S. Lake Survey, '72-4. Died at Macon, Ill., April, 1877.

*Charles A. Marshall. M. Am. Soc. C. E. Bridge Dept. Edge Moor Iron Co., '76-'80. Const. Engr., Cambria Iron Co., '81-4. Engr. of Tests, C. I. Co., '84-9. Drowned in Johnstown Flood, May, 1889.

Joseph Ripley. M. Am. Soc. C. E., do. Western Soc. of Engrs., do. Mich. Engr. Soc., do. Consulting Board of Engineers Panama Canal, Aug. '05-Feb. '06. Surveyor, Chippewa Co., '76-7. U. S. Asst. Engr., St. Mary's River, '77-'06. U. S. Asst. Engr. Survey Birmingham Canal, Ala., '97. Gen'l Supt. St. Mary's Falls Canal, '98-'06. *334 Portage Ave., Sault Ste. Marie, Mich.*

†John D. Sanders. Teaching, '76-7. D'ftsman and Asst. Insp. Edge Moor Iron Works, '77-8. Asst. Supt., Mine La Motte Lead Mines and Wks., '78-9. Supt. do. '79-'97. Asst. Mgr. Solvay Process Co., Detroit, '97 to date. *Detroit, Mich.*

John M. Schaeberle. M.S. (Hon. U. of M.), '93, LL.D. (Univ. of Cal.), '98. Private Asst. to Prof. Watson (U. of M.), '76-8. Asst. in Observatory, U. of M., '78-'85. Acting Asst. Prof. Astron., '85-6. Instructor do., '86-8. Astronomer, Lick Observatory, Cal., '88-'97. Acting Director, '97-8. Astronomical Investigator. *502 Second St., Ann Arbor, Mich.*

†Jonathan C. Shepard. Engr., U. P. R. R., '76-'81. Do. U. S. River Imp. Civil Engineer. *Escondido, Cal.*

Lester H. Strawn. Attorney at Law. *Ottawa, Ill.*

*Alonzo J. Tullock. M. Am. Soc. C. E. Engr. and Proprietor, Mo. Valley Bridge and Iron Works. Died at Leavenworth, Kan., July 19, 1904.

1877.

OSMER H. AIKINE. M. Mich. Engr. Soc. First Asst. Engr., M. P. G. & D. R. R., '80. Div. Engr., B. M. R. R. in Neb., '87. Asst. Gen'l Mngr., Magna Charta Silver Min. and Tunnel Co., '91-3. U. S. Dep. Mineral Surveyor, '79 to date. Mining Engr., the Raymond Consolidated Mines Co., '03 to date. ***Gunnison, Colo.***

HOLLAND W. BAKER. M. Am. Soc. C. E. U. S. Asst. Engr., Miss. and Mo. River Imp. Civ. Engineer. ***Kirkwood, Mo.***

WILLIAM BURTON. A.B. (Iowa Coll.), '75. A.M. (Iowa Coll.), '80. U. S. Dep. Surveyor, Co. Surveyor and Notary Public.
Garden Valley, Eldorado Co., Cal.

†BENJAMIN C. RICHARDS, (Civil).

EDWARD J. SNOVER. Treas., Owen & Co., Ltd., from '02 to date.
529 Third Ave., Detroit, Mich.

†JAMES E. TURTLE. U. S. Asst. Engr. Riv. Imp., '77-8. Do. Muscle Shoals Canal, '79-'82. Do. Miss. Riv. Imp., '83-6. Do. Harbor Imp. and Imp. of Rivers in Fla. and Ala. ***Warrington, Fla.***

1878.

*WALTER S. ABEL, (Mining). Assay Office, San Francisco. Died at San Francisco, May, 1887.

GEORGE F. ALLMENDINGER. Farmer, '79-'82. Mngr., Central Milling Co., '83-'00. Mngr., Delhi Mills, '85-6. Mngr., A. A. Milling Co., '92-7. Sec'y and Treas., Mich. Milling Co., '00 to date. Pres't Mich. State Millers' Assn., '00-'01.
1035 S. Main St., Ann Arbor, Mich.

*CLARENCE O. AREY. M.D. (Univ. of Pa.). In Charge Bacteriological Lab., Gov. Exp. Sta., '93. Architect. Died at Cleveland, O., August, 1896.

JAMES D. DUSHANE. U. S. Asst. Engr. in Charge of Miss. River Imp. from St. Paul to Mo. River, '78 to date.
Federal Bldg., St. Paul, Minn.

WM. V. GROVE. D.D.S. (Ohio Coll.), '81. Dentist.
610 Ellicott Square, Buffalo, N. Y.

†JOHN K. HANSON. Civil Engineer. ***Concord, Neb.***

*JOHN B. JOHNSON. M. Am. Soc. C. E. Do. Am. Soc. Mech. E. U. S. Asst. Engr., Lake Survey, '78-'80. Do. Miss. Riv. Com., '80-3. Prof. Civ. Eng., Wash. Univ., '85-'99. Dean Dept. Mech. and Eng., Univ. of Wis. Deceased.

TIMOTHEUS JOSENHANS. Architect. ***Seattle, Wash.***

HENRY W. JUDD, (Mining). Banker for 22 years. At present, Broker. Mem. Cleveland Stock Exchange.
The St. Regis, Euclid Ave., Cleveland, O.

EUGENE G. MANN, (Mining). Druggist.
213 S. Main St., Ann Arbor, Mich.

Seymour T. Morse, (Civil). A.B. (U. of M.), '01. Farming and Teaching. Also Insurannce Solicitor.
1025 Vaughn St., Ann Arbor, Mich.

Charles F. Owen. Chief Engr. on Steamboat, '78-'82. Engr., Harrison St. Pumping St. *6618 Drexel Ave., Chicago, Ill.*

***James Sanderson**. Asst. Engr., T. & A. A. R. R. Died at Bay City, Mich., September, 1885.

Ossian C. Simonds. M. Western Engr. Soc. Supt., Graceland Cemetery, '80-'03. Landscape Gardener do., '80-'05. Mem. Bd. of Mngrs. do., '00-'06. Landscape Gardener, O. C. Simonds & Co., '02-'06. *Buena Ave., Chicago, Ill.*

Frank L. Sizer. M. Montana Soc. of Engrs., do. Am. Inst. of Min. E., do. Nat'l Geographic Soc., do. Geological Soc. of Washington. D'ftsman, U. S. Survey Gen'l, Colo., '80-1. Chf. Clerk, U. S. Survey Gen'l, Mont., '82-3. Gen'l Mngr., Empire Min. Co., '86-8. Gen'l Mngr., Helena Pressed Brick Co., '88-'90. Chief of Office Irrigation Inquiry, Dept. of Agrl., Washington, D. C., '93. Chf. Min. Engr. for W. A. Clark, Butte, Mont., '98-'01. Gen'l Mngr., Rosario Mines, Mexico, '01-3. Do. Mo. and Mont. Gold Mng. Co., '03-4. Do. Whitlatch Mng. Co., '04 to date. Mngr., Eclipse-Argo Mining Co., July, '05 to date. Consulting Engr., Gould Mines Co., Mar., '06 to date. Do. Iron Mt. Tunnel Co., Jan., '06 to date.
731 Stuart St., Helena, Mont.

Hiram E. Terry. M. Mich. Eng. Soc. Co. Surveyor, '79-'80. Asst. Engr., D. L. & N. R. R., '81. Prin. Sch. Maple Rapids, '81-3. Do. Central Sch. E. Saginaw, '84-9. Asst. City Engr., Saginaw, '89-'96. City Engr. do., '96-'02. Civil Engineer, '02 to date.
721 Holland St., Saginaw, Mich.

†**Evert VanPelt**. Engr., Leavenworth & Topeka R. R. Civ. Engr.
Yoakum, Tex.

Andrew J. Wenzell, (Civil). Insp. and Asst. Engr., U. S. Rivers and Harbors, '78-'84. Asst. Engr., M. C. R. R., P. M. R. R., '84-7. Engr., Detroit Belle Isle Bdge., '88-'90. Div. Engr., C. M. & St. P. Ry., '87-8. Asst. Engr., G. R. & I. R. R., '90-2. Ch. Engr., L. S. & I. Ry., '92-3. Do. D. & M. R. R., '94-5. Contractor and miscell., '95-'00. Ch. Engr., Southern Ill., '00-1. Locating Engr., Mo. Pacific, Pere Marquette, '02-4. Consulting Engr., '04-6. Consulting Engr., Gabriel Concrete Steel Co., '06.
81 Marston Ct., Detroit, Mich.

†**Sidney B. Wight**, (Mining). Assayer and Chemist, Wyandotte Silver Works, '78. Do. Detroit and Lake Superior Copper Works, '79-'82. Do. Vulcan Ice Co., Newberry, '82-6. Supt. Land Dept., D. M. & M. R. R. and Peninsular Land Co., '86-'91. Secy. to Prest., M. C. R. R. Asst. Purchasing Agt., M. C. R. R.
786 Congress St. E., Detroit, Mich.

1879.

Charles S. Beadle. Div. Res. and Loc. Engr., A. T. & S. F. R. R. Chief Engr., K. C. & E. R. R. Loc. Engr., C. & St. L. Electric R. R. City Engineer. For the last ten years engaged in real estate and manufacturing.
341 Portage Ave., Sault Ste. Marie, Mich.

Charles C. Brown. M. Am. Soc. C. E. Do. Am. Soc. for Testing Materials, 1st V. Pres., Am. Soc. Mun. Imp. Secy. Nat'l Assoc. Cement Users. Secy., Ind. Eng. Soc. Pres., Inndianapolis Technical Club. U. S. Asst. Engr. Lake Survey, '79-'82. Asst. Engr., N. Y. State Survey, '82 and '86. Prof. Civ. Eng., Rose Polytechnic Inst., '83-6. Prof. Civ. Eng., Union College, '86-'93. Cons. Engr., N. Y. State Bd. of Health, '87-'93. City Engr., Indianapolis, '94-5. Asst. City Engr., Omaha, Neb., '96-7. Editor *Municipal Engineering,* Municipal Eng. Co., Editorial Writer, '95. Editor-chief, '00. Editor of "Directory of Am. Cement Industries," and "Handbook for Cement Users." Consulting Engr. in Municipal and Sanitary Work and Cement from '95 to date.. *28 S. Meridan St., Indianapolis, Ind.*

†Charles S. Henning. Res. and Div. Engr., A. & P. R. R., '80-3. Gen'l Rdmstr. do., '83-4. Chief Engr., J. C. K. & O. R. R., '85. Prest. Cherokee Coal Mining Co. *Cherokee, Kan.*

*Brayton D. King, (Mining). Died at Morgan Park, Ill., April, 1894.

†Horatio T. Morley. Shipbuilder and Vessel Owner.
Detroit, Mich.

Irving K. Pond, (Civil). Fel. Am. Inst. Architects. Pres't., Ill. Chapter A. I. A. Director, A. I. A. for three years. Member firm of Pond & Pond, Architects, engaged in general practice.
Room 1109, 21 Van Buren St., Chicago, Ill.

John C. Quintus, (Mining). M. Am. Soc. C. E. U. S. Asst. Engr., River and Harbor Imp., '79-'94. Prin. Asst. U. S. Engr., '94 to date. *540 Federal Bldg., Buffalo, N. Y.*

E. Fred Wood, (Mining). M. Am. Inst. Min. Eng., do. Iron and Steel Inst., do. Am. Chem. Soc., do. Am. Elec. Chem. Soc., Eng. Sec. Western Penna. Chemist, Union Iron and Steel Co., Chicago. Do. Pittsburg Bessemer Steel Co. Supt., Bessemer Dept. Carnegie Steel Co. Asst. Supt., Homestead Steel Wks. 1st V. Pres., International Nickel Co., '02 to date.
43 Exchange Place, New York City, N. Y.

1880.

John Ayers, (Mining). Cashier, Nat'l Bank of W. Ark., '80-2. Hardware Merchant, firm Ayers & Co., '83-'02. Secy. and Treas., Ketcham Iron Co., '00 to date. Do. Webber-Ayers Hardware Co., '02 to date. Do. Ayers Plumbing Co., '05 to date. *800 N. Twelfth St., Fort Smith, Ark.*

*Joseph A. Beaumont. Died at Armordale, Kan., March, 1885.

Samuel F. Beaumont, (Mining). Civil and Mining Engineer. *St. Louis, Mo.*

Edward S. Davis. U. S. Asst. Engr., Miss. Riv. Surveys, '80-3. Co. Surveyor, Hill Co., Texas, '79-'96. *Hillsboro, Tex.*

George L. Fisher. Architect. *Omaha, Neb.*

Cicero D. Hill. M. Western Soc. of Engrs. Asst. Engr., C. M. & St. P. R. R. Do. D. & R. G. R. R. Do. Hennepin Canal. Do. Dept. Pub. Wks., Chicago. Chief Engr. Sewers, Bd. Local Improvements, Chicago, '98-'06. *808 Farwell Ave., Chicago, Ill.*

†Frank P. Satterlee, (Mining). Assayer. Medical Student, '99. *San Francisco, Cal.*

1881.

George A. Brown. M. Ill. Assoc. of C. E. and Surveyors. Instrument man, P. McK. & Y. R. R., '81-2. Res. Engr., T. H. & L. R. R., '82-3. Junior Mem. of Engr. Firm, C. C. & G. A. Brown, '83-5. Asst. Engr., S. P. Co., '86-'9. U. S. Asst. Engr. (Irrigation Wk.), '89. Senior Mem. Engr. Firm, Brown & McCullough, '90-6. Secy. and Mngr., Public School Pub. Co., '97 to date. *1111 North Prairie St., Bloomington, Ill.*

†Randolph W. Brown. Merchant. *Rochester, (?) Minn.*

†John W. Dorst. Asst. Engr., D. & R. G. R. R., '81. U. S. Asst. Engr., Miss. Riv. Com., '81-5. Manufacturer. *863 Columbus Ave., New York, N. Y.*

William W. Follett. M. Am. Soc. C. E. Div. Engr., N. O. & N. E. R. R., '81-3. Engr. in Charge Red Riv. Bridge, Shreveport, La., '83-5. Div. and Loc. Engr., A. T. & S. F. R. R., '86-'88. Div. Engr., Irrigation Survey and U. S. Geological Survey, '89-'90. Asst. Engr., Artesian and Underflow Investigation, '90-1. Various Positions, '92-'96. Cons. Engr., International (Water) Bndry. Com. U. S. and Mexico, '97-'00 and '02 to date. *El Paso, Tex.*

John E. Hathaway. Contractor. *106 Mason St., Milwaukee, Wis.*

†David E. Hoover. Engr. Sanitary Dept., Pullman, Ill., '81. Asst. Engr., Mex. Central R. R., '82. Surveyor and Vineyardist. *Keuka, N. Y.*

*George A. Lederle. M. Am. Soc. C. E. Asst. Engr., Bismark Bridge, '81-'2. Do. Snake River Bridge, '82-3. Engr. in Charge Keithsburg Bridge, '85. Res. Engr., Omaha Bridge, '86. Do. Williamette Bridge, '87. Do. Snake River Bridge, '88. Civil Engineer and Contractor, Firm of Christie and Lawe. Died March 27, 1905.

†George W. Lilly. A.B. (Ohio Wesl.). Asst. Engr., Pullman, Ill., '81. Do. W. & L. E. R. R. Bdge., Toledo, '81. Do. S. C. & P. R. R. Bdge. over Mo. Riv., '82-4. Do. Queen and Crescent Ry. and private practice, '83-5. Legislature N. Dak., '89-'90. Atty. at Law, Ashley, N. Dak., '84-'95. Asst. City Engr., Columbus. *216 E. Eleventh Ave., Columbus, O.*

W. Clayton Miller. Resident Mgr., Empire State Idaho Mining and Dev. Co., '93-'03. Asst. Gen'l Mgr., Federal Mining and Smelting Co., Wallace, Ida., '03-'05. Gen. Mngr., Federal Mining and Smelting Co., '05 to date.
Exchange Bank Bl., Spokane, Wash.

1882.

Benjamin Douglas. M. Am. Soc. of C. E., do. Am. Ry. Engr. and Maintenance of Way Assoc., do. Mich. Engr. Soc., do. Detroit Engr. Soc. Asst. Engr., Detroit Bdge. and Iron Wks., '82-5. Bdge. Engr., M. C. R. R., '85-'05. Consulting Engr., '95-'05. Tunnel Engr., Detroit Riv. Tunnel Co., Aug. 1, '05 to date.
112 Michigan Central Station, Detroit, Mich.

†Malcolm W. Edgar. D'ftsman, Mich Car Co., '82-'93. Asst. Mngr., Union Car Co., '93-7. With Detroit Car Co., '97 to date.
Detroit, Mich.

†Mary Hegeler (Mrs. Paul Carus). *La Salle, Ill.*

William H. McEwan. Asst. Engr., D. L. & N. R. R., '82-4. Lumber Mnfgr., Seattle Cedar Lumber Mfg. Co.
P. O. Box 600, Seattle, Wash.

Samuel C. Weiskopf. M. Am. Soc. C. E. Asst. Engr., C. M. & St. P. R. R., '83-6. Inspecting and Bdge. Engr., Pittsburg, Pa., '86-'91. Consulting Engr., Carnegie Steel Co., '91-3. Do. Private Practice, '93-9. Chief Engr., Thompson-Starrett Co., '99-'05. Consulting Engr. Private Practice, '05 to date. Member of Firm, Weiskopf & Stem, Con. Engrs.
68 Williams St., New York, N. Y.

1883.

William H. Brenton. M. Roadmasters' Assn. of America. M. Polytechnic Soc. of Colo. Springs, Colo. Div. Engr. C. & A. R. R., '84-5. Div. and Res. Engr. C. R. I. & P. R. R., '86-8. Asst. Engr. Col. Midland R. R., '89-'91. Res. and Loc. Engr. C. R. I. & P. R. R., '92. Asst. Chief Engr. do., '94. Roadmaster do., '95-6. Roadmaster & Engr. Colo. Midland Ry., '96-'00. Res. Engr. C. R. I. & P. Ry., '01-3. Chief Engr., Stubb-Flick Johnston Construction Co., '04. Asst. City Engr., Colo. Springs, '05. Res. Engr. Atlantic & Birmingham Ry. Co., '06.
Fitzgerald, Ga.

Loomis E. Chapin. M. Am. Soc. C. E., do. Am. Water Works Assoc., do. Civil Engrs. Club of Cleveland, do. Ohio Engr. Soc. Asst. City Engr., Toledo, O., '83-7. Asst. Engr. with J. D. Cook, C. E., '87-'91. City Engr., Canton, O., '91-9. Consulting Engr., Water Wks., '91 to date. Firm Chapin & Knowles, Civil and Consulting Engrs., '02 to date. Offices at Canton, O., and Pittsburg, Pa. *15 Central Savings Bank Bldg., Canton, O.*

†GEORGE H. CHIPMAN. Asst. Engr., V. S. & P. R. R. Bridge at Shreveport. Co. Surveyor. *Childress, Tex.*

FRANK M. DUNLAP, (Mechanical). M.E., '85. M. Am. Soc. Mech. E. Charter Mem. Mich. Engr. Soc. Cor. Secy. do., '82-3. D'ftsman Iron Bay Mfg. Co., '83-4. Supt. Works, Detroit Gas Light Co., '87-8. D'ftsman F. W. Wheeler Co., Bay City, '89-'90. U. S. Asst. Engr., St. Mary's Falls; Designer Hydr. Mach'y, New Lock, '90-6. D'ftsman, U. S. Heater Co. at present. *260 W. Hancock Ave., Detroit, Mich.*

JOHN W. PAYNE. M. Ohio Engr. Soc. Pres. of same, '04. U. S. Surv. and Miss. Riv. Imp., '83-'4. In business, '84-'92. Asst. City Engr., Akron, O., '92-8. City Civil Engr., Akron, '98 to date. *79 Beck Ave., Akron, O.*

JOB TUTHILL. M. Am. Soc. C. E., do. Am. Ry. Engr. and Maintenance of Way Ass'n, do. Detroit Engr. Soc. Transitman Pike's Peak R. R., '83-4. D'ftsman Bdges and Bldg. Dept., C. M. & St. P. R. R., '84. Asst. Engr., D. L. & N. R. R., '84-9. Do. D. L. & N. R. R. and C. & W. M. R. R., '89-'90. Engr. of Bridges and Bldgs. do., '90-'00. Brdge. Engr., Pere Marquette R. R., '00 to date. *149 Horton Ave., Detroit, Mich.*

ISAAC O. WALKER. Member and Past President Roadmasters' Assoc. of America; M. Engr. Assoc. of the South; do Amer. Soc. for Testing Materials; do. Amer. Railway Engr. and Main. of Way Assoc. Topog., Miss. Riv. Survey, '83-5. Asst. Engr., D. L. & N. R. R., '86. Do. T. St. L. & K. C. R. R., '86-9. Roadmaster, T. St. L. & K. C. R. R., '90-'91. Asst. Engr., P. & M. Div. N. C. & St. L. R. R. to date. *1231 S. Sixth St., Paducah, Ky.*

1884.

HENRY D. BURNETT. Supt., Incandescent Lamp Works, Gen'l Elect. Co., Lynn, Mass. Do. Canadian Gen'l Elect. Co. *Peterborough, Ont.*

JAMES L. CALLARD. Ph.B. (Hillsdale Coll.), '80. Ph.M. (Hillsdale Coll.), '83. Div. Engr., C. & N. W. R. R., '84-6. Res. Engr., P. & S. S. M. R. R., '86-7. U. S. Inspector, War Dept., '87-'91. U. S. Asst. Engr., War Dept., '91 to date. *Morgantown, W. Va.*

WILLIAM G. CLARK. Jun. Am. Soc. C. E. M. Toledo Soc. of Engrs. Acting Prof. Civil Engr., Mo. School of Mines, Rolla, Mo., '86-7. Asst. City Civil Engr., Toledo, O., '87-'92. Mem. firm, Wickenden & Clark, Toledo, O., '92-5. City Civ. Engr., Toledo, O., '95-7. Chf. Engr.. Am. Sanitary Engr. Co., Detroit, Mich., '97-'00. Civ. and Consulting Engr., Toledo, O., '00 to date. *1043 Spitzer Bldg., Toledo, O.*

ROBERT C. GEMMELL. C.E., '94. M. Am. Soc. C. E., do. Am. Inst. M. E., do. Franklin Inst. Div. Engr., A. T. & S. F. R. R.; Bldg. and Water Service Engr., C. S. F. & C. R. R., '84-'90. Practicing Hydraulic Engr. in Oregon and Washington, '90-4. Practicing Hydraulic and Mining Engr. in Utah, '94-'01. Engr., De La Mar's Mines, '96-'01. State Engr. of Utah, '98-'01. Chf. Engr., Mexican Mining Syndicate, '01-'02. Supt., Minas Bonanza y Anexas for Guggenheim Exploration Co., '03-'04. Examining mines in Andalusia, Spain, '05. Since Jan. 1, 1906, Gen. Supt., Utah Copper Co.'s mines and mills. At present constructing a concentrating mill for same company of 6,000 tons daily capacity. *McCornick Block, Salt Lake City, Utah.*

JOHN C. STRENG, (Civil). M. Detroit Eng. Soc. M. Civil Engrs. Club of Cleveland. D'ftsman and Chief D'ftsman, Industrial Works, Bay City, '85-'93. Supt. of Erection do., '91-3. D'ftsman of The Bucyrus Co., So. Milwaukee, Wis., '93-5. Chf. D'ftsman and Asst. Engr. do., '95-'00. Acting Engr., Vulcan Iron Works, Chicago, '00-'01. Designing Engr., Hoover & Mason, Chicago, '01-4. Do. Great Lakes Eng'g Works, Detroit, '04-5. Engr., The Brown Hoisting Machinery Co., Cleveland, O., Nov., '05 to date. *60 Tennis St., Cleveland, Ohio.*

1885.

†EMIL BAUER. *Saginaw, Mich.*

EDWARD D. CLARY. M. Western Gas Ass'n; Am. Gas Ass'n; Iowa Gas Ass'n. Engr. United Gas Impt. Co., Phila., '86-9. Mgr. Gas Light Co., St. Albans, Vt., '87-9. Asst. Supt. G. L. Co., Paterson, N. J., '89. Mgr. Burlington G. L. Co., '89 to date. *916 N. 6th St., Burlington, Ia.*

ALEXANDER E. KASTL. C.E., '01. M. Am. Soc. C. E. U. S. Asst. Engr., Miss. Riv. Survey, '82-4. Do. Grand River Survey, '84. Asst. City Engr., Grand Rapids, Mich., '85. Asst. Engr., Drainage and Water Supply Com'n, Chicago, '86-7. Asst. Div. Engr., A. T. & S. F. R. R. in Ill., '87-8. Principal Asst. Engr., Brazos Riv. Channel and Dock Co., '88-'90. Chief Engr. do., '91. 1st Asst. Engr., Tampico Harbor Wks., Tampico, Mex., '90-1. U. S. Asst. Engr., Red River Survey, La., '91-2. Div. Engr., Sanitary Dist. of Chicago, '92-6. Engr. Asst., U. S. Deep Waterways Com'n, '96. Div. Engr. Metropolitan Water Wks., Mass., '96-'02. Chief Engr., Denver Union Water Co., Denver, Col., '02-'04. Consulting Engr., Reclamation Service, U. S. Geol. Survey, '04-'05. Consulting Engr., Feb. 1, '05 to date. Engr., Div'n of Water Pipe Extension Dept. of Public Works, Chicago, April, '05, to Sept., '05. Div'n Engr., Dam and Reservoir Dept., Metropolitan Water Works, Metropolitan Water and Sewerage Board, Boston, Mass., Sept., '05 to date. *124 Walnut St., Clinton, Mass.*

Charles H. Lane. LL.B. (Nat'l Univ.), '88. D'ftsman, Mo. Valley Bdge. Wks., '86. Prin. Exam. Patent Office from '93 to date.
Glencarlyn, Va.

Egbert T. Loeffler. D.D.S., '88. Practiced dentistry in Saginaw, W. S., from '88 to '03. Since then have held Chair of Dental Therapeutics at Ann Arbor.
No. 8 Cutting Flats, Ann Arbor, Mich.

George F. Samuel. Asst. City Engr., Lake View, Ill., '85-6. Do. Topeka, Kan., '87. Asst. Engr. Dept. Public Wks., Chicago, '88-'95. Consulting Engr., Chicago, '96-8. Asst. Engr. Dept. Public Wks., Chicago, '98-'05.
Dept. Public Works, Chicago, Ill.

Frank C. Wagner, (Mechanical). A.M., '84. M. Am. Soc. M. E. F. Am. Assoc. for Adv. Science. Erecting Expert, Thomson-Houston Electric Co., '86-9. Asst. Prof. Mech. Engr., Univ. of Mich., '90-6. Assoc. Prof. of Steam and Elect. Engr., Rose Polytechnic Inst., '96-'03. Prof. of Steam Engr. and Assoc. in Elect. Engr., Rose Polytechnic Inst., '04 to date.
1111 S. Sixth St., Terre Haute, Ind.

1886.

Raymond W. Beach. LL.B., '89. Asst. Engr., Chicago, Milwaukee & St. Paul Ry., '86-7. Do. Kansas City Belt Ry. Co., '87-8. Lecturer for Chicago Law School, '02-'05.
1501-4 Ashland Block, Chicago, Ill.

William W. Campbell. M.S. (Hon.), '99. Sc.D., '00. LL.D., '02. M. Astronomical Soc. of the Pacific; do. Astronomische Gesellschaft; do. Foreign Assoc. Royal Astronomical Soc.; do. Italian Spectroscope Soc.; do. Nat'l Acad. of Sciences. Fellow of Am. Assoc. for Advancement of Science. Corres. Mem. Soc. of Natural Sciences of Cherbourg. Corres. Mem. of Royal Astron. Soc. of Canada. M. of Astron. and Astrophysical Soc. of America. M. of Amer. Philosophical Soc. Received Gold Medal, Paris Academy of Sciences; do. Royal Astron. Soc. of London. Received Draper Gold Medal of Nat'l Acad. Science. Prof. Math., Univ. of Colo., '86-8. Inst. in Astron., U. of M., '88-'91. Astronomer, Lick Observatory, '91 to date. Director of the Lick Observatory since January 1, '01. In charge Crocker-Lick Observatory Eclipse Expedition to India, '98; to Georgia, '00; to Spain, '05. *Lick Observatory, Mt. Hamilton, Cal.*

Lewis E. Dunham, (Mining). Asst. Chemist, Joliet Steel Co., '86. Chemist, Furnace Co., Midland, Mo., '86-7. Private Practice, '87-9. Chemist, Ashland Iron and Steel Co., '89-'92. Asst. Mgr., Ashland I. & S. Co., '93-6. Mgr. do., '97-'04. Iron Ore Dept., M. A. Hanna & Co., Cleveland, '05.
24 Grassmere St., East Cleveland, O.

JOHN M. JAYCOX, (Mining). Mech. and Min. Engr.
Germantown, Pa.

GEORGE LOUGHNANE, (Civil). M. Western Soc. of Engrs. M. Nat'l Assoc. of Ry. Supts. of Bridges and Buildings. Inst. man E. J. & E. Ry., '87-'89. Asst. Engr. Houston, Texas Cen. & No. R. R., '89-'90. Do., C. & O. Ry., '90-2. Various positions, '92-3. Asst. Engr. W. & M. Ry., '94-6. Do. C. & N. W. Ry., '97-'03. Div. Engr. and Supt. B. & B., C. & N. W. Ry., '03 to date.
Mason City, Iowa.

JOHN C. MOSES, (Civil). B.S. (Urbana), '85. M. Am. Soc. of C. E.; do. Boston Soc. of C. E. Instr. in Math., Urbana Univ., '87-9. Asst. in Bdge. Engr's office, Mich. Central R. R., '89-90. Draftsman, Detroit Bdge. & Iron Works, '91-2. Dftsman, Boston Bdge. Wks., '93-5. Chf. Dftsman Do., '95-'03. Engr. of Construction, Do., '03 to date. *6 Irving Terrace, Cambridge, Mass.*

*FRED B. PELHAM, (Civil). Asst. Engr. M. C. R. R. Died at Detroit, February, 1895.

GEORGE ROEHM, (Civil). Detroit Engr. Soc. Asst. Bdge. Engr., M. C. R. R., '87-'90. Chf. Dftsman Milwaukee Bdge. & Iron Co., '90. Do. Wis. Bdge. Co., '92-3. Dftsman Detroit Bdge. & Iron Wks., '91-'02. Asst. Engr. Canadian Bdge. Co., Ltd. (Walkerville, Ont.), '02 to date.
301 25th St., Detroit, Mich.

†BENNO ROHNERT, (Civil). Jun. Am. Soc. C. E. Asst. Engr. Chesapeake Dry Dock Co., Newport News, Va., '88. U. S. Asst. Engr. St. Mary's Falls Canal. Do. Hay Lake and 21 ft. Channel Imp., '97 to date. *Sault Ste. Marie, Mich.*

†JAMES A. SINCLAIR, (Mechanical). Dftsman for M. Garland, Bay City. Salesman, E. P. Allis Co., Milwaukee. Prest. McArdle & Sinclair Mfg. Co. *New Orleans, La.*

EARL P. WETMORE, (Mechanical). Coast Engr. Sprague Elec. Motor Co. Do. N. W. Gen. Elect. Co. Gen. Agt. and Const. Engr. Gen. Elec. Co. Inventor Elec. Water Heaters. Asst. Chief Engr. London United Tramways. European Representative for the Lorain Steel Co.'s Surface Contact System of Electric Traction, 1900 to date.
71 King William St., London, E. C., England.

1888.

ALBERT BURNSTINE, (Civil). Sub-Inspector Public Wks., St. Mary's Falls Canal, '88-9. Asst. Engr. Coal Dept., U. P. R. R., '89. Supt. and Engr., Contractors St. Mary's Falls Canal, '89-'90. Do. Electrical Zinc Co., New York, '90-4. Contracting Engr., Berlin Iron Bridge Co., '94-00. Contracting Mngr. Amer. Bridge Co., and Milliken Brothers, New York, '00-'03. Engr. and Contractor, '03 to date. Spanish War, Lieut. (J. G.) U. S. N., U. S. S. Apache. *42 Broadway, New York, N. Y.*

FRED C. DAVIS, (Civil). B.S. (Mich. Agl.), '89. Civil Engr.
Lincoln, Placeo Co., Cal.

Metal Work Div., '89-'94. Principal Exam. Railway and Rolling Stock Div. Member of the Bar of the District of Columbia. Member of the Bar of the U. S. Supreme Court.
Room 304, U. S. Patent Office, Washington, D. C.

†CLIFFORD C. SMITH, (Mechanical). D'ftsman Blake Pump Co., '86-7. Chf. D'ftsman for S. T. Wellman. Constn. Engr. Wellman Iron and Steel Co., Chester, Pa. Asst. Head D'ftsman Plate Mill Constn., Ill. Steel Co. Chf. D'ftsman Loco. Crane Dept. Brown Hoisting and Conveying Mch. Co.
Cleveland, O.

†ERNEST STENGER, (Civil). Assoc. M. Am. Soc. C. E. D'ftsman A. S. F. & C. R. R. Do. Union Ry., Kansas City. Asst. Engr. Mo. Pac. R. R. Asst. City Engr. *Omaha, Neb.*

1887.

FRANK J. BAKER, (Mechanical). M. Nat'l Elect. Light Assoc. M. Ill. State Elect. Assoc. Secy. Hammond Light and Power Co. West. Agt. United Elect. Traction Co. Mgr. Madison Light and Power Co. Do. City Illum. Co. V. Pres. North Shore Electric Co. V. Pres. Chicago Suburban W. & L. Co. Pres. La Grange Service Co. *134 Washington St., Chicago, Ill.*

*BENJAMIN B. BOWEN, (Civil). Engr. P. & V. Iron Wks., Omaha. D'ftsman Gillette-Herzog Mfg. Co. Died at Cleveland, O., April, 1900.

SEWARD CRAMER, (Civil). LL.B., '91. Surveyor L. S. & M. S. R. R., '87-8. Do. Spring Valley Coal Co., '88-9. Reporter and Newspaper Correspondent since '92. *Ann Arbor, Mich.*

CHARLES Y. DIXON, (Civil). M. Am. Soc. of C. E.; do. Mich. Engr. Soc.; do. Detroit Engr. Soc. Transitman T. St. L. & K. C. R. R., '89. Do. Max Meadows, Va., Land and Imp. Co., '90-1. U. S. Asst. Engr. St. Mary's Falls Canal, '92-6. Do. Detroit Riv. Imp., '96 to date. *Amherstburg, Ont.*

JOSEPH HALSTED, (Mechanical). Mnf. Architectural Iron Work.
388-390 W. Randolph St., Chicago, Ill.

*WILLIAM R. HAND, (Civil). With Vierling, McDowell & Co. Dftsman P. E. Lane, Chicago. West. Agt. Lane Bdge. and I. Wks., Denver. Prof. of Eng. Sch. of Mines, Colo. Died at Denver, October, 1895.

†KENDAL W. HESS, (Mechanical). Dftsman Bay City Indust. Wks., '87-9. Genl. Mgr. McArdle & Sinclair Co.
New Orleans, La.

JOHN D. HIBBARD, (Mechanical). V. Pres. The John Davis Co., '89-'02. Pres. Do., '02 to date. Pres. Davis Construction Co., '97 to date. *22nd and Halstead Sts., Chicago, Ill.*

GEORGE B. HODGE, (Civil). M.Pd. '01. Supt. Schools, Le Sueur, Minn., '87-9. Prin. Normal Dept., Univ. of N. Dak., '90-2. Secy. Educational Dept. International Com. Y. M. C. A., '92 to date.
3 W. 29th St., New York, N. Y.

John M. Jaycox, (Mining). Mech. and Min. Engr. *Germantown, Pa.*

George Loughnane, (Civil). M. Western Soc. of Engrs. M. Nat'l Assoc. of Ry. Supts. of Bridges and Buildings. Inst. man E. J. & E. Ry., '87-'89. Asst. Engr. Houston, Texas Cen. & No. R. R., '89-'90. Do., C. & O. Ry., '90-2. Various positions, '92-3. Asst. Engr. W. & M. Ry., '94-6. Do. C. & N. W. Ry., '97-'03. Div. Engr. and Supt. B. & B., C. & N. W. Ry., '03 to date. *Mason City, Iowa.*

John C. Moses, (Civil). B.S. (Urbana), '85. M. Am. Soc. of C. E.; do. Boston Soc. of C. E. Instr. in Math., Urbana Univ., '87-9. Asst. in Bdge. Engr's office, Mich. Central R. R., '89-90. Draftsman, Detroit Bdge. & Iron Works, '91-2. Dftsman, Boston Bdge. Wks., '93-5. Chf. Dftsman Do., '95-'03. Engr. of Construction, Do., '03 to date. *6 Irving Terrace, Cambridge, Mass.*

*Fred B. Pelham, (Civil). Asst. Engr. M. C. R. R. Died at Detroit, February, 1895.

George Roehm, (Civil). Detroit Engr. Soc. Asst. Bdge. Engr., M. C. R. R., '87-'90. Chf. Dftsman Milwaukee Bdge. & Iron Co., '90. Do. Wis. Bdge. Co., '92-3. Dftsman Detroit Bdge. & Iron Wks., '91-'02. Asst. Engr. Canadian Bdge. Co., Ltd. (Walkerville, Ont.), '02 to date. *301 25th St., Detroit, Mich.*

†Benno Rohnert, (Civil). Jun. Am. Soc. C. E. Asst. Engr. Chesapeake Dry Dock Co., Newport News, Va., '88. U. S. Asst. Engr. St. Mary's Falls Canal. Do. Hay Lake and 21 ft. Channel Imp., '97 to date. *Sault Ste. Marie, Mich.*

†James A. Sinclair, (Mechanical). Dftsman for M. Garland, Bay City. Salesman, E. P. Allis Co., Milwaukee. Prest. McArdle & Sinclair Mfg. Co. *New Orleans, La.*

Earl P. Wetmore, (Mechanical). Coast Engr. Sprague Elec. Motor Co. Do. N. W. Gen. Elect. Co. Gen. Agt. and Const. Engr. Gen. Elec. Co. Inventor Elec. Water Heaters. Asst. Chief Engr. London United Tramways. European Representative for the Lorain Steel Co.'s Surface Contact System of Electric Traction, 1900 to date. *71 King William St., London, E. C., England.*

1888.

Albert Burnstine, (Civil). Sub-Inspector Public Wks., St. Mary's Falls Canal, '88-9. Asst. Engr. Coal Dept., U. P. R. R., '89. Supt. and Engr., Contractors St. Mary's Falls Canal, '89-'90. Do. Electrical Zinc Co., New York, '90-4. Contracting Engr., Berlin Iron Bridge Co., '94-00. Contracting Mngr. Amer. Bridge Co., and Milliken Brothers, New York, '00-'03. Engr. and Contractor, '03 to date. Spanish War, Lieut. (J. G.) U. S. N., U. S. S. Apache. *42 Broadway, New York, N. Y.*

Fred C. Davis, (Civil). B.S. (Mich. Agl.), '89. Civil Engr. *Lincoln, Placeo Co., Cal.*

Edwin H. Ehrman, (Mechanical). Dftsman, Morrison & Corthell, '88. Chf. Dftsman, Chicago Screw Co., '88-'95. Secy. and Supt. Walker & Ehrman Mfg. Co. (Mfrs. Milled Screws), '95 to date. *314 Washington Boulevard, Oak Park, Ill.*

John E. Hodge, (Civil). Dftsman, Spier & Rohns, Architects, '88. Dftsman, M. C. R. R., '88-9. Shipping Clk. and Foreman, W. G. Vinton Co., Detroit, '89-'90. Agt. N. E. Mut. Life Ins. Co., '90-1. Gen'l Agt. N. E. Mut. Life Ins. Co., '91-'01. Supt. of Exploration Work for E. I. Longyear, '02-3. Exploration and Contracting, Longyear & Hodge, '03 to date. *Galena, Ill.*

James A. Lewis, (Civil). C.E., '03. M. Western Soc. of Engrs. Dftsman and Supt. Arch. Iron Wks., '89-'93. Engr. for C. E. Clark, '93-'00. Chief Engr. for Henry Ives Cobb, Archt., '00-'05. General Supt. do., '02-'05. Civil Engr. *383 Third St., Brooklyn, N. Y.*

Ross L. H. Mahon, (Mechanical). Ph.B., '86. Dftsman, Detroit Dry Dock Co., '88-'90. At Mass. Inst. of Technology, '90-'91. Dftsman, Marinette Iron Wks., Duluth, '91-3. Broker in Duluth, '93-'03. Night Supt. Brown Hoisting Machinery Co., Cleveland, O., '03-4. Insp. and Junior Engr., U. S. Engineer Office, Sault Ste. Marie, '04 to date. *U. S. Engineer Office, Sault Ste. Marie, Mich.*

William H. Muir, (Mechanical). V. Pres. and Secy., Jenks & Muir Mfg. Co. *Palms Apartment, Detroit, Mich.*

Walter R. Parker, (Mechanical). M.D. (U. of Penn.), '91. Ensign U. S. N., '98. Prof. of Ophthalmology, U. of M. *311 S. State St., Ann Arbor, Mich.*

William H. Pease, (Civil). Instr. Math. Private School, Chicago, '88-9. Dftsman, Smith Bridge Co., and Toledo Bridge Co., '90-3. Dftsman, Detroit Bridge & Iron Wks., '93-'01. Dftsman, Detroit Plant Amer. Bridge Co., '01-3. Engr. Detroit Plant, Amer. Bridge Co., '03 to date. *11 Poplar St., Detroit, Mich.*

Willard Pope, (Civil). M. Amer. Soc. of C. E., do. Detroit Engr. Soc. Dftsman, Detroit Bridge & Iron Wks., '88-'92. Asst. Engr. do., '92-7. Secy. and Treas. do., '98-9. Pres't do., '00-'01. Vice-Pres't and Engr. Canadian Bridge Co., Ltd., Walkerville, Ont., '01 to date. *Walkerville, Ont.*

Percy H. Richardson, (Civil). C.E., '91. C. and Min. Engr. Norfolk Coal and Coke Co. U. S. Insp. Riv. and Harbor Imp., N. H. Prof. Hydraulic & Sanitary Engnineering, Purdue Univ., '92-3. City Eng. of S. Portland, '03. Local practice since '93. *120 Exchange St., Portland, Me.*

†Charles E. Roehl, (Mechanical). Asst. Dist. Engr., Edison Gen. Elec. Co., '92. Supt. W. & V. Tramway Co., B. C., '93. Supt. St. Jo. Ry., Light Heat and Power Co. *St. Joseph, Mo.*

Joseph P. Rusche, (Civil). Insp., Morison & Corthel. Asst to Div. Engr., C. & W. M. R. R. D'ftsman, do. Asst. Engr., G. R. & I. R. R., '99-'01. Engr. Records and M. W. and S. Accts. do. Contractor, '01 to date. *4 Portsmouth Terrace, Grand Rapids, Mich.*

*Edgar Ryan, (Civil). D'ftsman, Anaconda Smelting Wks. Died at Grand Island, Neb., June, '92.

Ralph M. Shankland, (Mechanical). M. Western Soc. of Engrs.; do. Am. Soc. C. E. D'ftsman, Wrought Iron Bridge Co., Canton, O., '88-9. Inspector, Penn. R. R., Pittsburg, '89-'90. Asst. Engr., D. H. Burnham & Co., '90-9. Member of firm, E. C. & R. M. Shankland, Civil Engrs., '99 to date.
1106 Rookery Bldg., Chicago, Ill.

†John W. Shotwell, (Civil).

Ernest M. Sprague, (Civil). Asst. Engr., C. & N. W. R. R., '88-'95. D'ftsman, Detroit Bridge Wks., '95. Do. Am. Bridge Wks., Chicago, '95-7. Do. N. P. Ry. Co., St. Paul, '97. Engr., S. W. Bridge Wks., Ft. Worth, '97. Engr. & Agt., Gillette-Herzog Mfg. Co., Denver, '98-'00. Contracting Engr., Am. Bridge Co. of N. Y., Denver, '00-'06. Contracting Mngr., Am. Bridge Co. of N. Y., '06 to date. *1310 Rockefeller Bldg., Cleveland, O.*

Herbert J. Stull, (Mining). Atty. at Law.
45 Trust Bldg., Rochester, N. Y.

Ebenezer F. Walbridge, (Civil). M. Toledo Soc. of Engrs. Engr. Corps, L. S. & M. S. R. R., '89-'90. Do. Toledo, '90-1. D'ftsman, Masillon Bdge. Co. Agt., Decorative Art Co., Cinn., '92-3. Secy. and Treas., Lloyd Lumber Co., '93-8. Do. Walbridge Lumber Co., '98-'03. Asst. Engr., Riggs & Sherman, Toledo, O., '03. Do. City of Toledo, '04 to date. At present Broker in stocks, bonds and real estate. *534 Spitzer Bldg., Toledo, O.*

Henry E. Whitaker, (Civil). M. Am. Soc. Mech. Engrs. Mech. D'ftsman., Jesse M. Smith, '88-'94. Mach. Designer, F. A. Hubel, '94-'01. Supt., Pacific Iron Works, '01-2. Asst. Div. Supt., Parke, Davis & Co., '02-6. Mech. Engr. do., '06 to date.
301 Forest Ave., W., Detroit, Mich.

Harry J. Williams, (Mechanical). M. Canadian Mining Institute. Mine Supt., '88-91. Assoc. Manager, '91-5. Beaver Asbestos Co., Thetford Mines. Montreal Asbestos Co. Danville Slate Co. Manager Asbestos & Asbestic Co., Ltd., '95-'00. Do. Beaver Asbestos Co., '00-'02. Do. Asbestos & Asbestic Co., Ltd., '02 to date. *Danville, P. Q., Canada.*

1889.

Flavius M. Crocker, (Civil). M. Engineers Club of Cincinnati. D'ftsman, C. & O. Railway, '89-'90. Engr. and Archt. Supt. Cinn., '90-1. Asst. Engr., Jenney & Mundie, Archts., Chicago, '92-3. Archt., Chicago, '93-4. Asst. Engr., The L. Schreiber & Sons Co., Iron Wks., '94-7. Chief Engr. do., '97 to date.
2157 Grand St., Cincinnati, O.

Herbert S. Crocker, (Civil). M. Am. Soc. of C. E.; do. C. E. Soc. of St. Paul; do. Western Soc. of Engrs. D'ftsman, B. & B. Dept., C. M. & S. P. R. R., '89-'91. Asst. to Engr. Bdges., N. P. R. R., '91-4. Asst. Engr., The L. Schreiber & Sons Co., '95.

Bdge. Engr., T. H. & B. R. R., '95-6. Asst. Engr., Lassig Bdge. & Iron Wks., '96. Asst. Engr., Bd. Public Wks., Denver, Colo., '97-'01. Asst. Erecting Mangr., Western Div., Am. Bridge Co., '01 to date. *1247 Monadnock Block, Chicago, Ill.*

JULIUS W. HEGELER, (Civil). M. Am. Inst. of Mining Engrs. M. Western Soc. of Engrs. With Matthiessen & Hegeler Zinc Co., '89-'94. Chief Engr. do., '94-'04. Member of firm, Hegeler Brothers, '04 to date. *203 North Hazel St., Danville, Ill.*

WILLIAM J. HUSSEY, (Civil). M. Am. Mathematical Soc.; M. Am. Astronomical and Astrophysical Soc.; M. Astron. Soc. of the Pacific; M. Washington Acad. of Sci.; Foreign Assoc. Royal Astronomical Soc. of London; Honorary Member Mexican Astronomical Soc. Asst. Naut. Almanac, Navy Dept., '89. Instr. in Math., U. of M., '89-'91. Instr. in Astron., U. of M., '91-2. Asst. Prof. of Astron., Leland Stanford Jr. Univ., '92-3. Assoc. Prof. of Astron. do., '93-4. Prof. of Astron. do. '94-6. Astron., Lick Observatory, Univ. of Cal., '96-'05. Expert on Observatory sites, Carnegie Institution, '03. In charge of Lick Observatory eclipse expedition to Egypt in 1905. Professor of Astronomy and Director of Observatory, U. of M., '05 to date.
The Observatory, Ann Arbor, Mich.

RICHARD KHUEN, JR., (Civil). M. Am. Soc. C. E. M. Engrs. Soc. of West. Penn. M. Am. Ry. Eng'g and Maintenance of Way Assoc. Insp. & Asst. Engr., Morrison & Corthell, also Geo. S. Morrison, '87-8 and '89-'91. Asst. Engr., Erie R. R., '90-'91. Do. Proposed Elevated R. R. in Phila., '91-2. Do. Pencoyd Iron Works, '92-'01. Res't Engr., Am. Bridge Co., Pittsburg District, '01 to date. *c/o American Bridge Co., Pittsburg, Pa.*

WILLIAM A. LIVINGSTONE, (Mechanical). M. Detroit Engr. Soc.; M. Assoc. Am. Soc. Naval Archt. Marine Engr. and Agent. Manufacturer, '97 to date. *Detroit, Mich.*

FREDERICK H. LOVERIDGE, (Mechanical). Elec. Engr., Standard Elec. Co., '90-3. Do. Western Elec. Co., '94 to date.
Western Electric Co., Chicago, Ill.

EUGENE MCALLASTER, (Mechanical). M. Pacific Northwest Soc. of Engrs.; do. Soc. of Naval Archts. & Marine Engrs.; Assoc. Mem. Am. Soc. of Naval Engrs. Asst. Engr., Detroit Dry Dock Co., '89-'94. Consulting Engr. & Naval Archt., '94 to date. M. firm, McAllaster and Bennett, '06 to date.
503-504 Pioneer Bldg., Seattle, Wash.

WILLIAM V. MOSES, (Mechanical), D'ftsman, S. T. Wellman, Cleveland, '89. Do. Iron and Steel Co., Thurlow, Pa., '90-3. Instr. Drawing and Mach. Design, Harvard Univ., '93-'01. Construction Engr., Wellman Seaver Morgan Co., Cleveland, O., '01-2. Student in Elect. Eng'g, Case School of Applied Science, Cleveland, O. '02-3. D'ftsman, General Electric Co., Turbine Dept., Lynn, Mass., '04 to date.
201 Humphrey St., Swampscott, Mass.

W. Clayton Miller. Resident Mgr., Empire State Idaho Mining and Dev. Co., '93-'03. Asst. Gen'l Mgr., Federal Mining and Smelting Co., Wallace, Ida., '03-'05. Gen. Mngr., Federal Mining and Smelting Co., '05 to date.
Exchange Bank Bl., Spokane, Wash.

1882.

Benjamin Douglas. M. Am. Soc. of C. E., do. Am. Ry. Engr. and Maintenance of Way Assoc., do. Mich. Engr. Soc., do. Detroit Engr. Soc. Asst. Engr., Detroit Bdge. and Iron Wks., '82-5. Bdge. Engr., M. C. R. R., '85-'05. Consulting Engr., '95-'05. Tunnel Engr., Detroit Riv. Tunnel Co., Aug. 1, '05 to date.
112 Michigan Central Station, Detroit, Mich.

†Malcolm W. Edgar. D'ftsman, Mich Car Co., '82-'93. Asst. Mngr., Union Car Co., '93-7. With Detroit Car Co., '97 to date.
Detroit, Mich.

†Mary Hegeler (Mrs. Paul Carus). *La Salle, Ill.*

William H. McEwan. Asst. Engr., D. L. & N. R. R., '82-4. Lumber Mnfgr., Seattle Cedar Lumber Mfg. Co.
P. O. Box 600, Seattle, Wash.

Samuel C. Weiskopf. M. Am. Soc. C. E. Asst. Engr., C. M. & St. P. R. R., '83-6. Inspecting and Bdge. Engr., Pittsburg, Pa., '86-'91. Consulting Engr., Carnegie Steel Co., '91-3. Do. Private Practice, '93-9. Chief Engr., Thompson-Starrett Co., '99-'05. Consulting Engr. Private Practice, '05 to date. Member of Firm, Weiskopf & Stem, Con. Engrs.
68 Williams St., New York, N. Y.

1883.

William H. Brenton. M. Roadmasters' Assn. of America. M. Polytechnic Soc. of Colo. Springs, Colo. Div. Engr. C. & A. R. R., '84-5. Div. and Res. Engr. C. R. I. & P. R. R., '86-8. Asst. Engr. Col. Midland R. R., '89-'91. Res. and Loc. Engr. C. R. I. & P. R. R., '92. Asst. Chief Engr. do., '94. Roadmaster do., '95-6. Roadmaster & Engr. Colo. Midland Ry., '96-'00. Res. Engr. C. R. I. & P. Ry., '01-3. Chief Engr., Stubb-Flick Johnston Construction Co., '04. Asst. City Engr., Colo. Springs, '05. Res. Engr. Atlantic & Birmingham Ry. Co., '06.
Fitzgerald, Ga.

Loomis E. Chapin. M. Am. Soc. C. E., do. Am. Water Works Assoc., do. Civil Engrs. Club of Cleveland, do. Ohio Engr. Soc. Asst. City Engr., Toledo, O., '83-7. Asst. Engr. with J. D. Cook, C. E., '87-'91. City Engr., Canton, O., '91-9. Consulting Engr., Water Wks., '91 to date. Firm Chapin & Knowles, Civil and Consulting Engrs., '02 to date. Offices at Canton, O., and Pittsburg, Pa. *15 Central Savings Bank Bldg., Canton, O.*

†George H. Chipman. Asst. Engr., V. S. & P. R. R. Bridge at Shreveport. Co. Surveyor. *Childress, Tex.*

Frank M. Dunlap, (Mechanical). M.E., '85. M. Am. Soc. Mech. E. Charter Mem. Mich. Engr. Soc. Cor. Secy. do., '82-3. D'ftsman Iron Bay Mfg. Co., '83-4. Supt. Works, Detroit Gas Light Co., '87-8. D'ftsman F. W. Wheeler Co., Bay City, '89-'90. U. S. Asst. Engr., St. Mary's Falls; Designer Hydr. Mach'y, New Lock, '90-6. D'ftsman, U. S. Heater Co. at present. *260 W. Hancock Ave., Detroit, Mich.*

John W. Payne. M. Ohio Engr. Soc. Pres. of same, '04. U. S. Surv. and Miss. Riv. Imp., '83-'4. In business, '84-'92. Asst. City Engr., Akron, O., '92-8. City Civil Engr., Akron, '98 to date. *79 Beck Ave., Akron, O.*

Job Tuthill. M. Am. Soc. C. E., do. Am. Ry. Engr. and Maintenance of Way Ass'n, do. Detroit Engr. Soc. Transitman Pike's Peak R. R., '83-4. D'ftsman Bdges and Bldg. Dept., C. M. & St. P. R. R., '84. Asst. Engr., D. L. & N. R. R., '84-9. Do. D. L. & N. R. R. and C. & W. M. R. R., '89-'90. Engr. of Bridges and Bldgs. do., '90-'00. Brdge. Engr., Pere Marquette R. R., '00 to date. *149 Horton Ave., Detroit, Mich.*

Isaac O. Walker. Member and Past President Roadmasters' Assoc. of America; M. Engr. Assoc. of the South; do Amer. Soc. for Testing Materials; do. Amer. Railway Engr. and Main. of Way Assoc. Topog., Miss. Riv. Survey, '83-5. Asst. Engr., D. L. & N. R. R., '86. Do. T. St. L. & K. C. R. R., '86-9. Roadmaster, T. St. L. & K. C. R. R., '90-'91. Asst. Engr., P. & M. Div. N. C. & St. L. R. R. to date. *1231 S. Sixth St., Paducah, Ky.*

1884.

Henry D. Burnett. Supt., Incandescent Lamp Works, Gen'l Elect. Co., Lynn, Mass. Do. Canadian Gen'l Elect. Co. *Peterborough, Ont.*

James L. Callard. Ph.B. (Hillsdale Coll.), '80. Ph.M. (Hillsdale Coll.), '83. Div. Engr., C. & N. W. R. R., '84-6. Res. Engr., P. & S. S. M. R. R., '86-7. U. S. Inspector, War Dept., '87-'91. U. S. Asst. Engr., War Dept., '91 to date. *Morgantown, W. Va.*

William G. Clark. Jun. Am. Soc. C. E. M. Toledo Soc. of Engrs. Acting Prof. Civil Engr., Mo. School of Mines, Rolla, Mo., '86-7. Asst. City Civil Engr., Toledo, O., '87-'92. Mem. firm, Wickenden & Clark, Toledo, O., '92-5. City Civ. Engr., Toledo, O., '95-7. Chf. Engr.. Am. Sanitary Engr. Co., Detroit, Mich., '97-'00. Civ. and Consulting Engr., Toledo, O., '00 to date. *1043 Spitzer Bldg., Toledo, O.*

Bernard L. Green, (Civil). M. Am. Soc. of C. E. M. Civil Engrs. Club of Cleveland. Asst. Engr. Merchants' Bridge, St. Louis, '89. Do. Terminal Ry., St. Louis, '90. Eng. Sec'y, E. L. Corthell, '91-2. Asst. Chief Engr., Tehuantepec Nat'l R. R., Mexico, '93. Asst. Engr., F. C. Osborn, '94-8. Associated with F. C. Osborn, '98-'00. Sec'y, The Osborn Engineering Co., '00 to date. *310 Genesee Ave., Cleveland, O.*

Harry J. Hatch, (Civil). Computer, Patton & Frank, Duluth, '91. Cashier, Farmers' Nat'l Bank, Arkansas City, Kan., '91-7. 2nd Lieutenant 2nd Regt. Artillery, U. S. Army, '98; transferred to 4th Artillery in '98. 1st Lieutenant, Artillery Corps, U. S. Army, '01. Captain, Artillery Corps, U. S. Army, '03 to date. Address, Captain H. J. Hatch, Art. Corps, C/o Military Sec'y, Washington, D. C. *Fort Barrmens, Fla.*

***William J. Hinkson**, (Civil). B.S. (Mich. Agl.). Died at Detroit, October, 1891.

†**John T. N. Hoyt**, (Civil). Assoc. M. Am. C. E. D'ftsman, Penncoyd Bdge. Co. Do. Brooklyn Elev. R. R. Do. L. L. Buck, N. Y. Do. R. P. & J. H. Staats. Do. Metropolitan Traction Co. *349 Madison Ave., New York, N. Y.*

William T. Keating, (Civil). M. Western Soc. of Engrs. Leveller, C. & N. W. R. R., '91-2. Asst. Engr., Sanitary Dist., Chicago, '92-'01. Supt. of Const., Lorimer and Gallagher Co., '01 to date. *577 S. Albany Ave., Chicago, Ill.*

Robert P. Lamont, (Civil). Eng. Dept. World's Fair, Chicago, '91-2. Sec'y and Engr. Shailer & Schniglau Co., Contractors, '92-7. V. Pres. Simplex Ry. Appliance Co., '97-'05. First V. Pres. Am. Steel Foundries, '95 to date. *217 E. 52nd St., Chicago, Ill.*

†**Edward J. Murphy**, (Civil). Asst. Engr. Sanitary Dist. *Chicago. Ill.*

Frederick S. Richmond, (Electrical). Elec. Engr., E. G. Barrett, Chicago. Do. L. K. Comstock Co. Do. Cleveland, Elyria & Western Ry., Cleveland. Asst. Mngr., Oak Park Yaryan Co., Oak Park. *10 Elisabeth Ct., Oak Park, Ill.*

George H. Rowe, (Electrical). M. Am. I. E. E. M. Soc. Promotion Eng'g Education. Asst. in Physics, U. of M., '91-2. Instr. Elec. Eng., U. of M., '92-3. Prof. Phys., Univ. of Colo., '93-5. Prof. Elec. Eng., Univ. of Colo., '95-'03. Dean, School of Applied Science of Colorado, '01-3. Designing Engr., Sen-Electric Co., '00-'01. Assoc. Prof. Elec. Eng. Stanford Univ., '03-5. Designing Engr., Western Elec. Co., '05-'06. Consulting Engr., 645, 1st National Bank, Chicago, '06 to date. Has published: Wave form variations of long distance lines, Variations of core losses with wave form, Alternating current laboratory testing (12 papers), New Harmonic Analyser. Translation of Heyland's circle diagram book (with R. E. Hellmund). *Riverside, Ill.*

Robert L. Sackett, (Civil). C.E., '96. M. Am. Assoc. for the Adv. Science. Pres. of Indiana Eng. Soc. in '04-5. Recorder River and Harbor Survey, '91. Asst. Prof. Math.,. Earlham College, '91-8. Prof. Applied Math., Earlham College, '98-'04. Prof. Civil Eng. do., '04 to date. Consulting Engr. for Indiana State Hospital Bd., '03-'06. *Earlham College, Richmond, Ind.*

David W. Spence, C.E. (B.S., U. of Tex.), '89. D'ftsman Lane Bridge and Iron Wks., Denver, '90-1. Do. So. Halsted Str. Iron Wks., Chicago, '91-2. Asst. Prof. Civil Eng. and Physics, Agl. and Mech. College, Texas, '92-8. Assoc. Prof. C. E. do., '98-'02. Prof. Physics do., '99-'04. Assoc. Prof. C. E. do., '02 to date. Asst. Engr. B. & B. Ry., Bryan, Tex., Vacation '94. Engr. Brazos River Channel & Dock Co., Valasco, Tex., Vacation '95 and '96. D'ftsman Union Bridge Co., Pittsburg, Pa., Vacation '99. Asst. Engr. H. E. & W. T. Ry., Houston, Tex., Vacation '00. D'ftsman Columbia Bridge Co., Pittsburg, Pa., Vacation '01. Asst. Locating Engr., G. W. T. and P. R. R., Victoria, Texas, Vacation '03. D'ftsman Penn. Bridge Co., Beaver Falls, Pa., Vacation '05. *College Station, Tex.*

Gabriel C. Tuthill, (Civil). M. Detroit Engr. Soc. Asst. Bridge Engr. M. C. R. R., '91-'05. *107 Horton Ave., Detroit, Mich.*

George M. Walker, Jr., (Civil). M. Am. Railway Engr. and Maintenance of Way Assn. Div. Engr., Gulf Colorado & Santa Fe Ry., '90-1. Res. Engr., Jacksonville Southeastern Line, '91-4. City Engr., Argentine, Kan., '94-7. Asst. Engr. and Roadmaster, Kansas City Belt Ry., '96 to date.
22nd St. and Grand Ave., Kansas City, Mo.

Thomas L. Wilkinson, (Mechanical). M. Am. Soc. Mech. Engrs. Do. Colo. Scientific Soc. D'ftsman M. C. Bullock Mfg. Co., Chicago, '91-2. Insp. Machinery, Joliet Plant, Ill. Steel Co., '92-3. Consulting Engr. Freeman-Smith Lumber Co., '94 to date. Do. Silver Lake Mines, Colo., '98-'00. Do. Bachelor Gold M. Co., Colo., '02 to date. Asst. Gen. Mngr. and Engr., South West Smelting & Refining Co., New Mex., '05-6. Consulting Mech. Engr., General Practice, since March 1st, '06.
213 Boston Bld., Denver, Colo.

1892.

John R. Allen, (Mechanical). M.E., '96. M. Am. Soc. Mech. E. M. Detroit Eng. Soc. Erector and D'ftsman Bay City Ind. Wks., '92-3. Engr. and Sec'y L. K. Comstock Co., '93-5. Mem. of firm Ball & Allen, '95-6. Instr. Mech. Engr. U. of M., '96-9. Asst. Prof. do., '99-'02. Jun. Prof. do., '02 to date.
226 S. Ingalls St., Ann Arbor, Mich.

Elmer L. Allor, (Civil). LL.B., '95. M. U. of M. Eng. Soc. M. Detroit Bar Ass'n. M. Mich. State Bar Ass'n. Inst. Astronomy U. of M., '92-3. Recorder U. S. Lake Survey, '91-4. Atty. at Law, '95 to date. Secy. Detroit Hotel Ass'n, '03 to date. Do.

Mich. State Hotel Ass'n, '04 to date. Do. Trion Fence Co., Adrian, '04 to date. General Counsel, Fairbanks Morse & Co., for Mich., 03 to date. *709 Union Trust Bldg., Detroit, Mich.*

THOMAS E. BARNUM, (Electrical). M. Am. Inst. E. E. D'ftsman General Elec. Co., '93-4. Do. Chicago Edison Co., '94-5. Do. Western Elec. Co., '95-6. Do. Crane Elevator Co., '96-8. Chief D'ftsman Cutler-Hammer Mfg. Co., '98-'01. Chief Engr. do., '01 to date. *96 18th St., Milwaukee, Wis.*

WILLIAM BASSETT, (Mechanical). M. Western Ry. Club. With Shaw Elec. Crane Co., '92. D'ftsman Industrial Wks., Bay City, '92-5. Chief D'ftsman do., '95-9. Mathematician Brooks Loco. Wks., Dunkirk, N. Y., '99-'02. Chief D'ftsman Industrial Wks., Bay City, '02 to date. *401 Birney St., Bay City, Mich.*

†IRVING D. CARPENTER, (Civil). D'ftsman Detroit Bridge Wks. Do. Am. Bridge Wks. Do. Elmira Bridge Co. Do. Keystone Bridge Wks. Dental Student U. of M., '98-9. *Ann Arbor, Mich.*

EDWIN H. CHENEY, (Electrical). Mem. Conference Committee of Eng'g Experiment Station on fuel tests of Univ. of Ill. Engr. with Chicago Edison Co., '92-8. Mngr. Mutual Elec. Co., '98-'00. Vice-Pres. and Mngr. Ill. Maintenance Co., '00 to date. Pres. Station Equipment Co., '01 to date. Pres. Fuel Eng'g Co., Consulting Fuel Engrs., '04 to date.
1625 Marquette Bldg., 204 Dearborn St., Chicago, Ill.

ELEAZAR DARROW, (Electrical). M. Am. Inst. of Elec. Engrs. Elect. Supt. Cinn., Newport & Cov. Ry. Co., Cinn. & Dayton St. Ry. Co., and Cinn. & Rosedale Ry., '92-4. Gen. Supt. Cinn., Edison and Queen City Elec. Co., '94-6. Director Dept. of Mech. and Elect. Eng., Washington State College, '96-'00. Chief Engr. Cinn., Newport & Cov. Rys., and Union Light, Heat and Power Co., '00-'03. Consulting Engr. Cinn. & Columbus Traction Co., Cinn. & Northwestern Ry., and Cinn. & Erlanger Ry., '03 to date. Consulting Engr. Toledo Urban & Interurban Ry., and Gen. Mngr. Toledo & Indiana Ry., '04 to date.
2222 Scottwood Ave., Toledo, Ohio.

ARTHUR FRANTZEN, (Mechanical). Assoc. M. Am. Inst. E. E. D'ftsman Fraser & Chalmers, '92-3. Insp. Arc Lamps Columbian Exp., '93-4. Elec. Engr. and Contractor, '94 to date. Sec'y and Treas. Arthur Frantzen Co.
92 West Van Buren St., Chicago, Ill.

JAMES N. HATCH, (Civil). M. Am. Soc. of C. E. M. Western Soc. of Engrs. M. Associated Eng. Societies. Mech. D'ftsman Phila., '92-3. Instr. Math. and C. E. Mich. Agl. Coll., '93-4. Asst. Engr. M. of W., C. C. C. & St. L. R. R., '94-5. Struct. D'ftsman Carnegie Steel Co., '95-7. Do. Pittsburg Bridge Co., '97-9. Asst. Engr. Brown Hoisting Mach. Co., '99-'00. Supt. of Const. U. S. Public Building, '00-'02. Chief D'ftsman Ericson & Lehman, Chicago, '02-3. Chief Struct. Engr. Sargent & Lundy, Chicago, '03 to date.
1720 Railway Exchange, Chicago, Ill.

†Charles A. Howell, (Mining). Asst. Mgr. W'n. Canal Const. Co. Transitman U. S. Eng. Corps. Mgr. Metallic Goods Mfg. Co. Atty. at Law. *Detroit, Mich.*

*William M. Johnstone, (Mechanical). Asst. Engr. Globe Iron Wks., Chicago. Eng. Dept. Col. Fuel and Iron Co. Died at Hamilton, Ill., September, 1898.

John P. Keyes, Ph.B., (Mechanical). D'ftsman Industrial Wks., Bay City, '92-'93. Brdg. Erecting, Union Brdg. Co., Buffalo, N. Y., '93-'94. Lumber Business, Brooks Bros., St. Paul, Minn., '94-'01. Gen. Mgr. Brooks-Scanlon Lumber Co., Minneapolis, Minn., '01 to date. Gen. Mgr. and Chief Engr. M. & W. W. R. R. Co., '02 to date. *Scanlon, Minn.*

William B. Larrabee, (Electrical). Asst. Engr. U. S. Top. Survey, Gray Nat'l Telautograph Co., '92 to date. *New York, N. Y.*

Alfred C. Lewerenz, A.B., '91, (Civil). Mem. Am. Soc. C. E. D'ftsman Detroit Bridge Wks., '92. Chief D'ftsman C. & W. M. and D. L. & N. R. R., '92-3. Asst. Engr. B. R. & P. R. R., '94-'98. U. S. Bureau Yards and Docks, Wash., '94-9. Civ. Engr. U. S. N., '99. In Charge Naval Station, New London, Conn., with special duty at other navy yards on Atlantic and Gulf of Mexico, '99-'03. In Charge Eng. Work, Navy Yard, Puget Sound, Wash., '03 to date.
Navy Yard, Puget Sound, Wash.

Arthur D. Mott, (Civil). M. Western Soc. of Engrs. D'ftsman Purdy & Henderson, '92-8. Member of firm Rosencranse & Mott, '98-9. Member of firm Ritter & Mott, '99-'05.
242 S. 18 Ave., Maywood, Ill.

Adnah C. Newell, (Electrical). Instr. Man. Train. Dept., Pueblo H. S., '92-4. Supervisor Man. Train., West Des Moines H. S., '94 to date. Head Teacher Mech. Drawing, West and North Des Moines H. S., '94-'06. *1011 18th St., Des Moines, Ia.*

Walter W. Seymour, (Civil). M. Western Soc. C. E. Asst. on City Engr. Corps, Grand Rapids. Do. Duffield & Son, Pineville, Ky. D'ftsman Chicago Bridge Wks. Do. Am. Bridge Wks., '93-'01. Engr. Am. Bridge Co., '01-4. Engr. Kenwood Bridge Co., '04 to date.
C/o Kenwood Bridge Co., Grand Crossing, Ill.

Albert H. Smith, (Civil). Assoc. M. A. S. C. M. Toledo Soc. of Engrs. D'ftsman Toledo Bridge Co., '92-'00. Asst. Mech. Engr. Am. Bridge Co., '00-'04. Civil and Mech. Engr., 322 The Nasby, Toledo, '04 to date. *1309 Utah St., Toledo, O.*

Edwin M. Smith, (Civil). Asst. Engr. M. C. R. R., '92-3. Asst. Engr. Sewer Dept., Chicago Drainage Canal, '93-4. Asst. Engr. St. Dept., Chicago, '94-7. Cleveland Mngr. Am. Luxfer Prism Co., '97-8. Gen. Mngr. Electric Co., '99. Eng'g Dept. C. & N. W. Ry., '00. Engr. Mich. Appraisal of R. R.'s, '00-'01. Locating Engr. Det. & Mac. Ry., '01. R. R. Supplies, Fairbanks, Morse & Co., '01-5. Mgr. Scales & R. R. Supplies, Canadian Fairbanks Co., Montreal, '05-6.
444 St. James St., Montreal, Canada.

H. S., '98-'00. Graduate Student U. of Chicago, '00-'01. Prof. of Math. Ill. Wesleyan Univ., '01-'03. Graduate Student U. of Chicago, '03 to date.
Room 31, North Hall, The University of Chicago.

RICHARD R. LYMAN, (Civil). M.C.E. (Cornell Univ.), '03. Assoc. Am. Soc. C. E., Prof. Math. and Eng., Brigham Young Acad., Provo, Utah, '95-6. Inst. in Eng. Univ. of Utah, Salt Lake City, '96-7. Asst. Prof. Drawing and Eng. do., '97-'00. Prof. of Civil Eng. do., '00 to date. Member of firm, Lyman & Wilson, Civil and Consulting Engrs., 14-30 Eng'g Bldg., Univ. of Utah. *1084 Third St., Salt Lake City, Utah.*

THOMAS K. MATHEWSON, (Civil). Asst. Inspector Miss. River Imp., '95. Asst. to City Engr., Muscatine, Ia., '96. Asst. to Engr. of Maintenance, Burlington, Cedar Rapids & Northern Ry., '96. In charge of terminals Rio Grande, Sierra Madre y Pacifico, Mex., '97-8. Locating Engr. El Gran Pacifico, Mex., '98-'01. Do. Guanajuato Power & Electric Co., Mex., '02-4. Construction Engr. Guanajuato Reduction & Mines Co., '05. Do. Guanajuato Power & Electric Co., '06.
Apartado 23, Zamora, Michoacan, Mex.

WILLIAM J. MELCHERS, (Electrical). M. Am. Assoc. Adv. of Science. Wire Chief Mich. Tel. Co., Saginaw Exch., '95-8. Mngr. Valley Tel. Co., Saginaw, '98-9. Dist. Mngr. Mich. Tel. Co., Saginaw Dist., '99-'02. Chief Engr. Hecla Portland Cement & Coal Co., Bay City, '02-3. Gen. Mngr. and Engr. Union Tel. Co., Alma, '03-6. *Alma, Mich.*

CHARLES A. MINER, (Civil). M. Am. Soc. C. E. Computer U. S. Engs., 4th Dist. Miss. River Comm'n, New Orleans, La., '94-5. Surveyor U. S. Engrs., U. S. Engr. Dist. Fortifications, New Orleans, La., '05. Asst. Engr. do., '95-8. First Lt. 3d U. S. Vol. Engrs., '98-9. Asst. Engr., U. S. Engr., Washington, D. C. Fortifications, '99-'02. Private practice, New York, '02. Princ. Asst. Engr., U. S. Engrs., River and Harbor Imp., Wilmington, Del., '02-4. Treas. and Business Mgr. Atlantic Dredging Co., Phila., '04 to date. *230 East Washington St., Petersburg, Va.*

CHARLES H. MORSE, JR. (Mechanical). M.E., '97. M. Am. Soc. M. E. Asst. Mfg. Dept. Fairbanks, Morse & Co., '97. Sales Dept. do., '98. Mech. Engr. do., '99-'03. Pres't Fairbanks, Morse Mfg. Co., '03 to date. Vice Pres't Fairbanks, Morse Canadian Mfg. Co., '05 to date.
249 E. 49th St., Chicago, Ill.

JOHN F. NICHOLS, (Mechanical). Machinist F. W. Wheeler Co., '95. D'ftsman do, '95-7. Do. Bay City Ind. Wks., '97-8. Do. Newport News Ship Build. and Dry Dock Co., '98-9. Leading D'ftsman do, '00 to date. *R. F. D., Hampton, Va.*

ELBERT NICHOLSON, (Mechanical). Asst. to City Engr., Kalamazoo, and Geo. S. Pierson, intermittently '90-'97. City Engr., Sterling, Ill., '05. Sewer Contracting, '97-8. D'ftsman, now Supt. of Wm. E. Hill & Co., '98 to date.
129 Carmel St., Kalamazoo, Mich.

Arian S. Parker, (Civil). Structural Engr. Purdy & Henderson, '95-'06. *78 Fifth Ave., New York City.*

Albert S. Passolt, (Electrical). Asst. to Prof. Carhart, '95-6. Elect. with Field & Hinchman, Detroit, '96. Do. Bartlett Illum. Co., Saginaw, '96-7. Do. U. of M., '97. Supt. Elec. Light Co., '98 to date. *Columbus, Miss.*

Clarence H. Perry, (Civil). Eng. Corps, Chicago N. Side R. R. Died at Chicago, March, 1896.

Eth E. Roberts, (Civil). D'ftsman King Bdge. Co., '95-7. Do. Webster, Camp & Lane, '97-8. Do., in charge of squad, Detroit Plant Am. Bdge. Co., '98 to date. *55 Park Ave., Detroit, Mich.*

Dward M. St. John, (Civil). M. C. E. Club of Cleveland. Inspector of Masonry U. S. Govt., St. Mary's Falls Canal, '92-3. Transitman L. S. & M. S. R. R. Co., '95-8. Asst. Engr. Mo. Valley Bdge. & Iron Wks., '98-9. D'ftsman Brown Hoisting & Conveying Mach. Co., '99-'00. Do. Am. Bdge. Co., '00-'04. Member of firm, The St. John Eng'g Co., '04 to date. *1749 Railway Exchange, Chicago, Ill.*

Ilbur G. Salter, (Mechanical). D'ftsman Andrews & Johnson, Heat. and Vent. Engrs., '95. Asst. Engr. City of Chicago, '95-6. Dept. Mgr., Gen. Mgr., Sec'y, Treas. Troy Bakery Co., '96-9. Pres. and Treas. Salter-Holmes Mfg. Co. (Bicycle Sundries), '98. Mngr. F. Salter & Co. (wholesale liquors), '99-'00. Technical Mngr. (Consulting) Hapgoods, '04-'05. Consulting and contracting, Building, Apartments, etc., Promoting Electric Rys., Investments, etc., Brokerage, W. G. Salter & Co., Brokers, '00 to date. Mngr. Colcord & Salter, Archts., '04 to date. *6557 Perry Ave., Chicago, Ill.*

Illiam Schaake, (Mechanical). M. Am. Soc. M. E. D'ftsman Kenwood Bdge. Co., '05. Designer, Sligh Bicycle Co., '96. D'ftsman Shaw Elec. Crane Co., '97-8. Designer, Crane Dept., Pawling & Harmschfeger, '98-'01. Designer, Railway Dept., Gen. Elec. Co., '01-'05. Elec. Eng. Dept., British Westinghouse Co., '05 to date. *C/o British Westinghouse Co., Trafford Park, Manchester, Eng.*

Mmet Scott, (Mechanical). M. Western Gas. Assoc. M. Mich. Gas Assoc. Stationary Engr., Bookkeeper, Asst. in Office, Supt. Constr., Niles & Scott Co., LaPorte, Ind., '95-'03. Treas. Petoskey, Bay View & Northern Gas Co., Petoskey, '02-'05. Prop'r LaPorte Gas Meter Co., '04 to date. *LaPorte, Ind.*

Frederick G. Skinner, (Civil). D'ftsman and Transitman Metrop. St. Ry. *Kansas City, Mo.*

Ester A. Stanley, (Electrical). With Karoly Elec. Co., and Amer. Gas. Engine Elec. Co., Chicago, '95-6. Instr. Physics and Elec. Eng., Provo, Utah, '97-'00. Mngr., Assay Dept., Mine & Smelter Supply Co., El Paso, Texas, '01-2. Examiner U. S. Patent Office, '03 to date. *Patent Office, Washington, D. C.*

HERBERT J. GOULDING, (Mechanical). M. Am. Assoc. for Advance of Sci. D'ftsman Saginaw Mfg. Co., Saginaw, Mich., '93-4. Post Graduate Student, U. of M., '94-5. Instr. in Drawing U. of M., '95-'04. Asst. Prof. Descriptive Geometry and Drawing U. of M., '04 to date. Secy. Dept. of Eng'g U. of M., '00-'06.
904 Lincoln Ave., Ann Arbor, Mich.

LEON M. GROESBECK, (Mining). Admitted to the Bar of the State of Illinois, '99. *4454 Oakenwald Ave., Chicago, Ill.*

LEONARD F. W. HILDNER, (Mechanical). M. Engrs. Soc. of Western Penn. Instr. in Math. Detroit High School, '94. D'ftsman Detroit Bridge & Iron Wks., '94-6. Do. Pittsburg Bridge Co., '96-7. Do. Ritter-Conley Mfg. Co., '97-8. Chief D'ftsman do., '98-'05. Chief Engr. Pittsburg Bridge & Iron Wks., '05 to date.
Gass Ave., Allegheny, Pa.

THEODORE H. HINCHMAN, (Mechanical). A.B., '91. M. Detroit Eng. Soc. M. Am. Soc. Mech. E. D'ftsman, Asst. to Prof. M. E. Cooley, '93. Do. Jesse M. Smith, '93-4. D'ftsman M. C. R. R., '93. Chf. Machinist, U. S. S. Yosemite, '98. Engr. Field & Hinchman, '94-'03. Engr. Field, Hinchman & Smith, '03 to date. *710 Washington Arcade, Detroit, Mich.*

JOSEPH S. H. HOLMES, (Mechanical).

ALFRED W. HOOKWAY, (Electrical). Merchant. M. firm W. R. Hookway & Son, Real Estate, Loans, Insurance and Rentals.
100 E. Colorado St., Pasadena, Cal.

*HIRAM HOWDEN, (Mechanical). Died at Silver Springs, N. Y., 1894.

CLARENCE W. HUBBELL, (Civil). M. Am. Soc. C. E. M. New Eng. Water Works Ass'n. M. Mich. Eng. Soc., and Sec'y Detroit Eng. Soc. Chf. D'ftsman Detroit Water Works, '93-8. Civil Engr. Detroit Water Works, '98-'05.
Water Office, Detroit, Mich.

MELBURN W. HULL, (Mechanical). D'ftsman Bay City Ind. Wks. Director Manual Training, Pueblo, '97-'05.
323 Broadway, Pueblo, Colo.

VALENTINE S. IVES, (Civil). M. Detroit Eng. Soc. D'ftsman Toledo Bdge. Co., '93-5. Civil Engr. for A. P. Ruggles. Computing King Bridge Co., '95. Asst. Engr. Co. Surveyor's Office, Cleveland, '95-8. Treas. J. F. Hartz Co., '98-9. Sec'y Rowley Scale and Supply Co., '00 to date. *44 Congress St. E., Detroit, Mich.*

*CARROLL D. JONES, (Electrical). E.E., '97. Inst. Elect. Eng. U. of M. Died at Saranac Lake, New York, in July, 1901.

FRED L. KEELER, (Electrical). *Grass Lake, Mich.*

ALFRED C. MARSHALL, (Electrical). M. Detroit Eng. Soc. Secy. and Treas. Mich. Elect. Assoc. Asst. Elect. Insp. Mich. Insp. Bureau, '93-4. Elect. Supt. of Lines and Outside Supt. Pub. Lighting Com., Detroit, '94-9. Chief Engr. Rapid Ry. System, Detroit, '99-'03. Elect. Engr. Detroit Edison Co., '03-5. Gen'l Mngr. Port Huron Light and Power Co., Port Huron, '05.
824 Huron Ave., Port Huron, Mich.

GEORGE H. MILLER, (Electrical). D'ftsman F. B. Rae, Elec. Eng., Detroit, '93. Supt. Royal Cycle Wks., Marshall, Mich., '94. Prof. Sci., Marshall H. S., '94-8. Inst. Sci. and Asst. Prin., Blue Island H. S., '98-'04. Mngr. Dept. of Education, Sears, Roebuck & Co., Chicago, '04 to date. *Elmhurst, Ill.*

JOSEPH J. MORSEMAN, (Civil). With Carter White Lead Co., Omaha and Chicago, '93-'06. *143 E. 47th St., Chicago, Ill.*

LLEWELLYN S. POMEROY, (Civil). M. U. of M. Eng. Soc. U. S. Sub. Insp. Masonry, St. Mary's Falls, '92. Asst. Engr. Sewers, Dayton, O., '93. Instr. Mech. Drawing Y. M. C. A., Kalamazoo, '96-7. U. S. Insp. Plaquemine, La., '00-'01. U. S. Insp., Sabine, Tex., '01-2. Asst. Cons. Engr. C. C. C. & St. L. Ry. Co., '02-6. *P. O. Box 575, Kalamazoo, Mich.*

MINOTT E. PORTER, (Civil). C.E., '98. D'ftsman Sears Typo Matrix Co., Cleveland, '94. Computor Hydrographic Office, Navy Dept., '94-7. Computor U. S. Naval Observatory, '97 '01. Asst. Examiner, U. S. Patent Office, '01 to date. *Patent Office, Washington, D. C.*

HOWARD M. RAYMOND, (Electrical). M. Soc. for the Promotion of Eng. Education. Prof. of Experimental Physics, Armour Institute of Technology, Chicago, '95-'05. Since 1903, Dean of Armour Institute. *Armour Institute of Technology, Chicago, Ill.*

EDWARD S. REID, (Mechanical). Jun. Am. Soc. Mech. E. Asst. to Prof. Cooley, '94. Chf. D'ftsman Whiting Foundry Equipment Co., Engr. Northern Engineering Wks., Detroit, '99 to date. *70 Pingree Ave., Detroit, Mich.*

HUGH RODMAN, (Electrical). M. Am. Electrochemical Soc. D'ftsman Alaska Coast Survey, '93-6. Mining, Alaska, '96-9. Experimental Work, Elect. Storage Battery Co., '99-'03. Engr. Willard Storage Battery Co., '03-5. Experimental Work, Westinghouse Machine Co., '05 to date. *Westinghouse Machine Co., East Pittsburg, Pa.*

EDWIN J. ROSENCRANS, (Civil). C.E., '00. M. Am. Soc. of C. E. M. Western Soc. of Engrs. Structural D'ftsman J. H. Gray, Chicago, '95. Do. Purdy & Henderson, New York, '95-7. Chf. Engr. Green & Wicks, Archts., Buffalo, '97-8. Mem. of firm Rosencrans & Mott, Chicago, '98-9. Do. Green & Wicks, Archts., Buffalo, '99-'01. Do. Jackson & Rosencrans, Archts., New York, '01 to date. *31 Union Square, New York, N. Y.*

WILLIAM W. TAYLOR, (Mining). M. Am. Inst. Min. Engrs. Asst. Chemist Ill. Steel Co., '94-6. Chemist Mo. Fce. Co., St. Louis, Mo., '96-7. Do. Iron Gate Furnace, Iron Gate, Va., '97-9. Supt. Iron Gate Furnace, '99-'01. Supt. Allegheny Iron and Steel Co., Div. Supt. Empire Steel and I. Co., '01. Gen. Supt. Allegheny Ore and Iron Co., '02 and at present. *Clifton Forge, Va.*

O. L. E. WEBER, (Mechanical). M. Am. Soc. Mech. E. M. Mich. Eng. Soc. Supt. and Mngr. Michigan Sulphite Fibre Co., '94-'05. *Port Huron, Mich.*

Edward D. Wickes, (Electrical). Assoc. Mem. Am. Soc. C. E. Gen. Engr. up to '99. D'ftsman Carl Binder, C. E., Structural Steel, '99-'00. Do. Riter-Conley Mfg. Co., Pittsburg & Milliken Bros., New York, '00-'01. Engr. Bridge and Bldgs., The Cuba Co., New York, '01-'03. Min. Engr., Gen. Supt. Mines, The Low Moor Iron Co., Virginia, '03-'05. Supt. Coal Dept. do., Nov. 15, '05 to date. *Covington, Va.*

Neil H. Williams, (Electrical). M.S., '95. Supt. Clinton Elec. Co., '93-4. Prof. Sci. W. Bay City H. S., '95-7. Prin. do., '97-8. Instr. Physics and Chem. Central H. S., Detroit, '98-'00. Instr. Physics Shortridge H. S., Indianapolis, '00-'03. Instr. Physics Rose Polytechnic Inst., '03-5. Asst. Prof. Physics do., '05.
1837 N. Eighth St., Terre Haute, Ind.

Frank A. Windes, (Mechanical). M. Ill. Soc. Engineers and Surveyors. M. Western Soc. Civ. Engrs. and Surveyors. Survey Transp. Bldg., Columbian Exposition. Asst. Supt. Pub. Wks. Bldg. Contractor, '93. Asst. Engr. Winnetka, Ill., '94-6. With Bowen & Anderson, City Engrs., Waukegan and Lake Forest Co. City Engr. Winnetka and Glencoe, and Instr. Man. Training, Public Sch. City Engr. Winnetka, '98-'05. Do. Glencoe, '99-'05. Do. Winthrop Harbor, '04-'05. Gen. Civil Eng. and Surveying; special attention given to road and sewers. City Engr. of Kenilworth, Ill., '05 and '06. *Winnetka, Ill.*

Clarence G. Wrentmore, (Civil). M.S., '98. C.E., '01. M. Detroit Eng. Soc. Instr. Des. Geom. U. of M., '93-'02. Asst. Prof. Des. Geom. do., '02-'04. Asst. Prof. C. E. do., '04 to date. D'ftsman Cambria Steel Co., Struc'l Dept., '01-'02. Estimator Cambria Steel Co., Est. Dept., '03.
933 Forest Ave., Ann Arbor, Mich.

1894.

Abraham K. Adler, (Mechanical). With McDonald Eng. Co., '94-5. Mech. Engr. with Dankmar Adler, Archt., '96-'00. Archt. Treat & Adler, '00-'02. Archt., '02-5. Chicago Mngr. Trussed Concrete Steel Co. *1641 Monadnock Bldg., Chicago, Ill*

Robert L. Ames, (Mechanical). D'ftsman St. Ry. Co., Grand Rapids. Do. City Engr. Office, Kalamazoo, '92. U. S. Lake Survey '93-4. Asst. Exam. Patent Office, '94-'00. Patent Lawyer, 'o to date. At present, junior member of firm, Jones, Addingto & Ames.. *100 Washington St., Chicago. I*

Archibald L. Becker, (Mechanical). Chief D'ftsman Montag Iron Works Co., '94-'01. Do. Craig Ship Bldg. Co., '01-'05. I Toledo Ship Bldg. Co., '06 to date.
2217 Summit Ave., Toledo.

John C. Bird, (Mechanical). Machinist Kalamazoo Ry. Velocip and Car Co., '94. D'ftsman Fox Machine Co., Grand Rap '94-7. Do. Geo. D. Wolcott & Son, Jackson, '97. Do. Niag Machine and Tool Co., Buffalo, N. Y., '98. Do. Brow

Sharpe Mfg. Co., Providence, R. I., '98-9. Asst. Supt. Geo. D. Wolcott & Son, Jackson, '99-'00. D'ftsman Fred'k A. Verdon Co., Hoboken, N. J., '00. Do. Guild & Garrison, Brooklyn, N. Y., '01-2. Mech. Engr. Union Steam Pump Co., Battle Creek, '03-6.
46 Howland St., Battle Creek, Mich.

†James Blair, (Mechanical). Asst. to Prof. Cooley, '94-5. D'ftsman D. H. Burnham & Co., Arch. Do. Hawley Downdraft Furnace Co., Chicago.
Santa Marta, Columbia, S. A.

Howard E. Chickering, (Mechanical). D'ftsman Detroit Bridge and Iron Wks., '94-6. Do. Am. Bridge Wks., '96-7. Gas Eng. Expert, Fairbanks, Morse & Co., '97-'05. Branch Mangr. do., '05 to date.
99-101 Water St., Cleveland, O.

†Harry W. Clark, (Mechanical). Asst. Nat. Blower Co., '95. D'ftsman E. E. Myers, Arch. Supt. Hospital, U. of M.
Ann Arbor, Mich.

†William C. Conant, (Mechanical). D'ftsman Chicago Screw Co. Do. Fraser & Chalmers. Machinist Am. Spring Co. Die and Tool Maker, Moon Mfg. Co.
Oak Park, Ill.

Clarence S. Cooke, (Electrical). Instr. Physics, Central H. S., '94 to date.
883 Brooklyn Ave., Detroit, Mich.

Almon H. Demrick, (Electrical). Asst. Field & Hinchman, '94-5. Supt. and Engr. Scott Bros. Elec. Co., '95-6. Constructing with Hunt Air Co., '96-7. Constructing Engr. Fisher Elec. Co., '97. Elec. Contractor A. H. Demrick & Co., '97-9. Asst. Engr. Gilbert Wilkes, Constructing Engrs., Detroit, '99-'01. Const. and Estimating Engr. Gilbert Wilkes & Co., Denver, Colo., '01-4. Elec. Engr. U. S. Geol. Survey, Salt River Project, Arizona, '04 to date.
Roosevelt, Ariz.

Herman H. Eymer, (Mechanical). M. Mich. Eng. Soc. D'ftsman Detroit Bridge and Iron Wks., '94-5. Do. Am. Bridge Wks., '95-6. Asst. City Engr. Saginaw, Mich., '96-'01. Co. Engr. and Road Commissioner, Co. Good Roads System, Saginaw Co., '01-3. Civil Engr. and Surveyor, '03 to date. Engr. C. H. McOmber & Co., Civil Engrs. and Contractors, '06 to date.
402 Owen St., Saginaw, Mich.

Herbert E. French, (Civil). M. Western Soc. of Engrs. With Reedsburg Woolen Mills, '94-7. With C. & N. W. E. E. Co., '97-'04. City Engr. and Supt. of Water Wks., '04-5.
Baraboo, Wis.

Oscar Gruelich, (Civil). Arch. D'ftsman, '94-5. Do. Nat. Blower Co. Do. Illinois Steel Co. (Milwaukee), '96. Heating and Ventilating Engr., Wm. Bayley & Sons Co., '96 to date.
176 S. Bay St., Milwaukee, Wis.

John C. Hammond, (Mechanical). M.S. (Chicago), '97. M. Am. Astron. and Astrophys. Soc. Asst. U. S. Nautical Almanac Office, '98-'00. Computer U. S. Naval Observatory, '00-'04. Asst. Astronomer do., '04 to date.
U. S. Naval Observatory, Washington, D. C.

†Harrie D. Hamper, (Mechanical). Asst. D. L. Barnes, Cons. Eng. With West, Wheeled Scraper Co. *Aurora, Ill.*

†Charles J. Harmon, (Electrical). Asst. to Chf. Engr. M. of W., S. E. R. R. With Morgan & Wright, '97-8. Do. Ames & Frost, '98 to date. *Chicago, Ill.*

George Hayler, Jr., (Mechanical). Assoc. M. Am. Inst. E. E. M. Ohio Electric Light Assoc. Mngr. Gas-Electric Light and Power Co., Van Wert, O., '94-'04. Engr. Auburn Automobile Co., Auburn, Ind., '02-3. Engr. The Arnold Co., Chicago, '04-5. Supt. The Spring River Power Co., Joplin, '05 to date. *315 Miners Bank, Joplin, Mo.*

Harry R. King, (Electrical). Designer Hawthorne Wks. of the Western Electrical Co. Mngr. Hawthorne Wks., '01 to date. *W. 48th Ave. and 24th St., Hawthorne, Ill.*

Max Lichtenstein, (Civil). Civil Engr. *Elgin, Ill.*

Daniel B. Luten, (Civil). M. Indiana Engr. Soc. M. Indianapolis Technical Club. Instr. Civil Engr. U. of M., '94-5. Instr. Arch. and San. Engr., Purdue Univ., '95-'00. Chf. Engr. Luten Eng. and Const. Co., '00-'01. Chf. Engr. Nat'l Bridge Co., '01-2. Pres. Nat'l Bridge Co., '02 to date. *802 Traction Terminal, Indianapolis, Ind.*

Ralph W. Newton, (Civil). D'ftsman Detroit Bridge Wks., '94-5. Do. Columbus Bridge Wks., '95. Do. Carnegie Steel Co., '96-7. Do. Riter-Conley Mfg. Co., '97-8. Do. Pittsburg Bridge Co., '98-'00. Do. Am. Bridge Co., '00-'05. D'ftsman Riter-Conley Mfg. Co., '05 to date. *101 Brushton Ave., Pittsburg, Pa.*

Frederick C. Noble, (Civil). C.E., '04. Mem. Am. Soc. C. E. Do. Municipal Engrs. of N. Y. City. Do. Brooklyn Engrs. Club. Rodman St. L. K. & N. W. extension, Summer of '92. Surveyor Christie & Lowe, Contractors, Chicago, '94. D'ftsman J. H. Gray, Structural Engr., Chicago, '95. D'ftsman and Designer Purdy & Henderson, Structural Engrs., New York, '96-7. Structural Engr. Green & Wicks, Archts., Buffalo, '98. Civil Engr. Westinghouse, E. & M. Co., Pittsburg, '99. Asst. Engr. Rapid Transit Com'n, New York, '00-'02. Structural Engr. Metropolitan St. Ry. Co., Kansas City, Mo., '02. Senior Asst. Engr. Rapid Transit Com'n, N. Y., '03-'05. Division Engr. do., '05-6. *416 Clermont Ave., Brooklyn, N. Y.*

Robert K. Palmer, (Civil). D'ftsman Am. Bdge. Wks., '04. Do. New Columbus Bdge. Co., '95. Do. Elmira Bdge. Co., '95-6. Do. Hamilton Bdge. Wks., '96-'00. Chf. D'ftsman do., '00-'04. Asst. Engr. in charge of bridge design do., '04 to date. *49 W. Main St., Hamilton, Ont.*

William P. Parker, (Civil). Assoc. Mem. Am. Soc. C. E. D'ftsman Detroit Heating & Lighting Co. Do. Detroit Metal and Heating Co. Do. Detroit Dry Dock Co. Do. Kenwood Bdge. Co. Do. Whiting Fdry. Equipment Co. Do. Massillon Bdge. Co. Do. Pittsburg Bdge. Co. Do. Carnegie Steel Co. Do. Keystone Bdge. Wks. Color Sergt. 1st U. S. Vol. Engrs. In Chief Engr's office and Asst. Chief D'ftsman, Structural Dept.,

Cambria Steel Co. Struc. Engr. Webster Camp & Lane Co., Cleveland Dept. Office and Field Engr. A. M. Blodgett, Contr. Engr., since July, '02.
Room 5, Water Wks. Bd., Kansas City, Mo.

RICHARD QUINN, (Civil). M. Am. Soc. C. E. U. S. Asst. Engr., '95 to date. U. S. Engineer Office, Room N, Custom House.
New Orleans, La.

†OSCAR ROBERTS, (Civil). Missionary, Batanza, W. Africa.
Johannesburg, S. Africa.

FRED A. ROGERS, (Electrical). M. Western Soc. of Engineers. Assoc M. Am. Inst. of E. E. Elec. Engr. Vermillion Milling & Electric Co., '95-6. Asst. in Physics, Lewis Institute, Chicago, '96-7. Instr. in Physics & Elec. Eng. do., '97-'02. Asst. Prof. Physics & Elec. Eng. do., '02 to date.
1647 Monroe St., Chicago, Ill.

FRED A. SAGER, (Electrical). Asst. Physics, U. of Ill., '94-5. Instr. in Physics do., '95-6. Asst. Prof. Physics do., '96-'03. Elec. Engr. The Arnold Co., '03 to date.
6215 Washington Ave., Chicago, Ill.

WILLIAM S. SMITH, (Mechanical). *Aurora, Ill.*

GOLDWIN STARRETT, (Mechanical). M. Engr. Club of New York City. Arch. D'ftsman and Asst. Engr., D. H. Burnham & Co., Archts., Chicago, '94-8. Supt. Construction, Geo. A. Fuller Co., Pittsburg, '98. Asst. to Gen. Mangr., Geo. A. Fuller Co., New York, '98-'00. Sec'y and Director, Thompson-Starrett Co., New York, '00-'04. 2nd Vice-Pres't E. B. Ellis Granite Co., Northfield, '04 to date. *Northfield, Vt.*

†GEORGE C. WEARE, (Mechanical). With Sherwin Williams Co., Paint and Color Mfrs. *Cleveland, O.*

JOSEPH WEARE, (Civil). M. Dip. Columbian, '00. D'ftsman Detroit Bridge & Iron Co., '95. Do. New Columbus Bridge Co., '95-6. Do. Hamilton Bridge Works, '97-'00. Do. Mt. Vernon Bridge Works, '98—. Mngr. Mexican Comml. Co., San Gabriel, Mex., '01-'05. Now with Canadian White Co., Building Dept.
C/o Canadian White Co., Engrs., Montreal, Canada.

1895.

LOUIS W. ANDERSON, (Civil). M. Mich. Eng. Soc. Recorder U. S. Harbor Surveys, '95. Insp. & D'ftsman do., '95-6. Asst. City Engr., Grand Rapids, Mich., '97-9. City Engr. do., '00 to date.
City Hall, Grand Rapids, Mich.

WALTER M. AUSTIN, (Electrical). Chief D'ftsman, Storey Motor & Tool Co., '97-'01. Designer, Westinghouse Air Brake Co., '01-'06. *1910 Wayne St., Swissvale, Pa.*

WILLIAM G. BILLINGS, (Electrical). Asst. to R. R. Commissioner, '95-7. Eng. Chase Constr. Co., '97-'00. Bank Cashier Davison State Bank, '00 to date. *Davison, Mich.*

August Blaess, (Civil). Asst. (Eng. Corps) D. & M. R. R., '95-6. Do. I. C. R. R., '97. Do. Penna. Co., '98. Res. & Asst. Engr. I. C. R. R., '98-'02. Road Supt. I. C. R. R., '02 to date. *Cherokee, Iowa.*

Abraham L. Burgan, (Electrical). M.S., '96. M. Am. Soc. of M. E. Asst. Elect. Dept., Calumet & Hecla Mining Co., '91-2. Asst. Supt. Tamarack Mining Co.'s and Osceola Consolidated Mining Co.'s Stamp Mills, '96-'00. Supt. Isle Royale Copper Co.'s Stamp Mills, '00-'01. Supt. Tamarack Mining Co.'s and Osceola Consolidated Mining Co.'s Stamp Mills, '01-'05. *Hubbell, Mich.*

*Platt R. Bush, (Civil). Levelman Munsing R. R., '95. Asst. Engr. Lehigh Valley Coal Docks. Died at Detroit, October, 1898.

William R. Caldwell, (Civil). Asst. City Engr., Sault Ste. Marie, '95-6. Asst. Engr. Lake Superior Power Co., '96-7. Junior Engr. U. S. Survey, '99-'01. Do. U. S. Lake Survey, '01-3. City Engr., Traverse City, '03-5. *416 Sixth St., Traverse City, Mich.*

Wallace W. Chickering, (Mechanical). Engine Dept., Fairbanks, Morse & Co., '95-'05. *1014 Emerson St., Beloit, Wis.*

Howard M. Cox, (Mechanical). L.L.B. (John Marshall Law School, Chicago), '05. D'ftsman Denver Eng. Wks., '95-6. Do. Chisholm, Boyd & White Mach. Co., '96-7. Do. Chicago Edison Co., '97. Cost. Dept. Gates Iron Wks., '97-8. Patent Lawyer to date. *1133 Monadnock Bldg., Chicago, Ill.*

George A. Damon, (Electrical). Assoc. Mem. Am. Inst. E. E. Active Mem. Western Soc. of Engrs. Asst. to B. J. Arnold, Elec. Engr., '95-9. Associated with B. J. Arnold, '99-'02. Engr. Arnold Electric Power Station Co., '02-4. Managing Engr. The Arnold Company, Engrs., Constructors, '05 to date. *Borland Block, LaSalle and Monroe Sts., Chicago, Ill.*

†James H. Dickson, (Electrical). A.B., '94. Asst. to Field & Hinchman, Elec. Engrs. *Detroit, Mich.*

James H. Dunbar, (Civil). M. Western Soc. of Engrs. D'ftsman Various Bridge Co's., '95-8. Engr. Matthiessen & Hegeler Zinc Co., '98-'03. Mech. Engr. The Grasselli Chemical Co., '03 to date. *C/o The Grasselli Chemical Co., Cleveland, O.*

*John H. Dye, (Civil). Engr. to Kingdom of Korea. Died April 29, 1903.

Harvey G. Gilkerson, (Civil). M. Am. Inst. Min. Eng. Wit M. K. & T. Ry., D. & R. G., and C. C. & C. S. Ry., '95-7. U. S Dept., Mineral Surveyor for Colorado and Nevada, '97 to dat Civil and Mining Engr. *P. O. Box 348, Goldfield, Nevad*

R. Prosper Gustin, (Mechanical). Jun. Am. Soc. C. E. D'ftsma Baldwin Loco. Wks., '96-7. Asst. Engr. Degnon Contracti Co., '97-'06. *1500 Bedford Ave., Brooklyn, N.*

LEXANDER M. HAUBRICH, (Electrical). Assoc. Mem. Am. Inst. E. E. Supt. Water Wks., Amherstburg, Ont., '93-5. Electric Light & Telephone Const., Detroit, Mich., '95-6. Do. Toledo, Ohio, '96-7. Elec. Engr. Central Union Telephone Co., Chicago, Ill., '97-'01. Sales Engr., Stromberg Carlson Tel. Mfg. Co., '01-'06. ***70 W. Jackson Blvd., Chicago, Ill.***

RYSON D. HORTON, (Electrical). **M. Internat'l Elec. Congress. Foreman, Bartlett Ill. Co., Saginaw, '95-6. Asst. Engr. Park and Boulevard Com., Detroit, '96-7. Electrician, Pub. Light Com., '97. Chf. Electrician U. S. S. Yosemite, '98. Do. Pub. Light Com., '99. Supt. of Construction, Public Light Com., '00. Elect. Engr. Detroit Copper Mining Co., Morenci, Ariz. Ter., '01 and '02. Mngr. Horton-Morehouse Co., manufacturers of Arkless Enclosed Fuses, '03 to date.**
11-23 Raynor St., Detroit, Mich.

OHN HULST, (Mechanical). D'ftsman Whiting Foundry Equip. Co., '95-6. Do. Am. Fire Engine Co., '97-8. Do. Ohio Steel Co., '98-'00. Do. South Sharon Steel Co., '01. Do. Ohio Wks., Carnegie Steel Co., '01 to date.
342 Lincoln Ave., Youngstown, O.

ILTON B. HUNTOON, (Electrical). Teacher H. S.
Menominee, Mich.

LARENCE T. JOHNSTON, (Civil). C.E., '99. M. Am. Soc. C. E., Association of State Engineers and Wyoming Soc. Civil Engineers and Surveyors. Eng. Corps, State of Wyoming. Irrigation and Reservoir Wk. Stream Gauging U. S. Geol. Survey. Asst. State Engr., Wyoming. Asst. Chf. Irrigation Investigations, U. S. Dept. Agriculture, '99-'03. State Engr., Wyoming, '03 to date. *Cheyenne, Wyoming.*

ORACE W. KING, (Civil). D'ftsman U. S. Surveyor General, Tucson, Ariz., '98-9. Instrumentman, Isthmian Canal Commission, '99-'01. Provincial Supervisor, Philippines Civil Gov't, '01-2. Res't Engr. Canton Hankow Ry., China, '02-3. U. S. Asst. Engr., Harbor Work, Manila, P. I., '03-'04. Field Asst. Reclamation Service, U. S. Geol. Survey to March 20th, '06. Engr. U. S. Reclamation Service, March 21st, '06 to date.
Echo, Oregon.

ARRY V. KNIGHT, (Electrical). Instr. Sc., Alpena H. S., '96 to date. *Alpena, Mich.*

AVID LE FAVOUR, (Civil). Grad. Student U. of M., '96. D'ftsman D. & M. Ry., '96-8. Treas. Bay City Round Hoop Co., '98-9. D'ftsman D. & M. Ry., '99-'01. Treas. Wallaceburg Sugar Co., Ltd., '01-'03. Sec'y Treas. and Asst. Mngr. do., '03 to date.
Wallaceburg, Ont.

EMAN B. LEONARD, (Electrical). M. Sigma Xi. With Toledo Elec. St. Ry., '95. D'ftsman and Engr. Bissell, Dodge & Erner Co. Instr. Math., Kalamazoo H. S., '96-8. Instr. Physics, Racine

H. S., '98-'00. Graduate Student U. of Chicago, '00-'01. Prof. of Math. Ill. Wesleyan Univ., '01-'03. Graduate Student U. of Chicago, '03 to date.
Room 31, North Hall, The University of Chicago.

Richard R. Lyman, (Civil). M.C.E. (Cornell Univ.), '03. Assoc. Am. Soc. C. E., Prof. Math. and Eng., Brigham Young Acad., Provo, Utah, '95-6. Inst. in Eng. Univ. of Utah, Salt Lake City, '96-7. Asst. Prof. Drawing and Eng. do., '97-'00. Prof. of Civil Eng. do., '00 to date. Member of firm, Lyman & Wilson, Civil and Consulting Engrs., 14-30 Eng'g Bldg., Univ. of Utah.
1084 Third St., Salt Lake City, Utah.

Thomas K. Mathewson, (Civil). Asst. Inspector Miss. River Imp., '95. Asst. to City Engr., Muscatine, Ia., '96. Asst. to Engr. of Maintenance, Burlington, Cedar Rapids & Northern Ry., '96. In charge of terminals Rio Grande, Sierra Madre y Pacifico, Mex., '97-8. Locating Engr. El Gran Pacifico, Mex., '98-'01. Do. Guanajuato Power & Electric Co., Mex., '02-4. Construction Engr. Guanajuato Reduction & Mines Co., '05. Do. Guanajuato Power & Electric Co., '06.
Apartado 23, Zamora, Michoacan, Mex.

William J. Melchers, (Electrical). M. Am. Assoc. Adv. of Science. Wire Chief Mich. Tel. Co., Saginaw Exch., '95-8. Mngr. Valley Tel. Co., Saginaw, '98-9. Dist. Mngr. Mich. Tel. Co., Saginaw Dist., '99-'02. Chief Engr. Hecla Portland Cement & Coal Co., Bay City, '02-3. Gen. Mngr. and Engr. Union Tel. Co., Alma, '03-6.
Alma, Mich.

Charles A. Miner, (Civil). M. Am. Soc. C. E. Computer U. S. Engs., 4th Dist. Miss. River Comm'n, New Orleans, La., '94-5. Surveyor U. S. Engrs., U. S. Engr. Dist. Fortifications, New Orleans, La., '05. Asst. Engr. do., '95-8. First Lt. 3d U. S. Vol. Engrs., '98-9. Asst. Engr., U. S. Engr., Washington, D. C. Fortifications, '99-'02. Private practice, New York, '02. Princ. Asst. Engr., U. S. Engrs., River and Harbor Imp., Wilmington, Del., '02-4. Treas. and Business Mgr. Atlantic Dredging Co., Phila., '04 to date. *230 East Washington St., Petersburg, Va.*

Charles H. Morse, Jr. (Mechanical). M.E., '97. M. Am. Soc. M. E. Asst. Mfg. Dept. Fairbanks, Morse & Co., '97. Sales Dept. do., '98. Mech. Engr. do., '99-'03. Pres't Fairbanks, Morse Mfg. Co., '03 to date. Vice Pres't Fairbanks, Morse Canadian Mfg. Co., '05 to date.
249 E. 49th St., Chicago, Ill.

John F. Nichols, (Mechanical). Machinist F. W. Wheeler Co., '05. D'ftsman do, '95-7. Do. Bay City Ind. Wks., '97-8. Do. Newport News Ship Build. and Dry Dock Co., '98-9. Leading D'ftsman do, '00 to date. *R. F. D., Hampton, Va.*

Elbert Nicholson, (Mechanical). Asst. to City Engr., Kalamazoo, and Geo. S. Pierson, intermittently '90-'97. City Engr., Sterling, Ill., '05. Sewer Contracting, '97-8. D'ftsman, now Supt. of Wm. E. Hill & Co., '98 to date.
129 Carmel St., Kalamazoo, Mich.

Marian S. Parker, (Civil). Structural Engr. Purdy & Henderson, '95-'06. *78 Fifth Ave., New York City.*

†Albert S. Passolt, (Electrical). Asst. to Prof. Carhart, '95-6. Elect. with Field & Hinchman, Detroit, '96. Do. Bartlett Illum. Co., Saginaw, '96-7. Do. U. of M., '97. Supt. Elec. Light Co., '98 to date. *Columbus, Miss.*

*Clarence H. Perry, (Civil). Eng. Corps, Chicago N. Side R. R. Died at Chicago, March, 1896.

Seth E. Roberts, (Civil). D'ftsman King Bdge. Co., '95-7. Do. Webster, Camp & Lane, '97-8. Do., in charge of squad, Detroit Plant Am. Bdge. Co., '98 to date. *55 Park Ave., Detroit, Mich.*

Edward M. St. John, (Civil). M. C. E. Club of Cleveland. Inspector of Masonry U. S. Govt., St. Mary's Falls Canal, '92-3. Transitman L. S. & M. S. R. R. Co., '95-8. Asst. Engr. Mo. Valley Bdge. & Iron Wks., '98-9. D'ftsman Brown Hoisting & Conveying Mach. Co., '99-'00. Do. Am. Bdge. Co., '00-'04. Member of firm, The St. John Eng'g Co., '04 to date. *1749 Railway Exchange, Chicago, Ill.*

Wilbur G. Salter, (Mechanical). D'ftsman Andrews & Johnson, Heat. and Vent. Engrs., '95. Asst. Engr. City of Chicago, '95-6. Dept. Mgr., Gen. Mgr., Sec'y, Treas. Troy Bakery Co., '96-9. Pres. and Treas. Salter-Holmes Mfg. Co. (Bicycle Sundries), '98. Mngr. F. Salter & Co. (wholesale liquors), '99-'00. Technical Mngr. (Consulting) Hapgoods, '04-'05. Consulting and contracting, Building, Apartments, etc., Promoting Electric Rys., Investments, etc., Brokerage, W. G. Salter & Co., Brokers, '00 to date. Mngr. Colcord & Salter, Archts., '04 to date. *6557 Perry Ave., Chicago, Ill.*

William Schaake, (Mechanical). M. Am. Soc. M. E. D'ftsman Kenwood Bdge. Co., '05. Designer, Sligh Bicycle Co., '96. D'ftsman Shaw Elec. Crane Co., '97-8. Designer, Crane Dept., Pawling & Harmschfeger, '98-'01. Designer, Railway Dept., Gen. Elec. Co., '01-'05. Elec. Eng. Dept., British Westinghouse Co., '05 to date. *C/o British Westinghouse Co., Trafford Park, Manchester, Eng.*

Emmet Scott, (Mechanical). M. Western Gas. Assoc. M. Mich. Gas Assoc. Stationary Engr., Bookkeeper, Asst. in Office, Supt. Constr., Niles & Scott Co., LaPorte, Ind., '95-'03. Treas. Petoskey, Bay View & Northern Gas Co., Petoskey, '02-'05. Prop'r LaPorte Gas Meter Co., '04 to date. *LaPorte, Ind.*

†Frederick G. Skinner, (Civil). D'ftsman and Transitman Metrop. St. Ry. *Kansas City, Mo.*

Lester A. Stanley, (Electrical). With Karoly Elec. Co., and Amer. Gas. Engine Elec. Co., Chicago, '95-6. Instr. Physics and Elec. Eng., Provo, Utah, '97-'00. Mngr., Assay Dept., Mine & Smelter Supply Co., El Paso, Texas, '01-2. Examiner U. S. Patent Office, '03 to date. *Patent Office, Washington, D. C.*

Isaac F. Steen, (Civil). With Wm. Sooy Smith, '95. D'ftsman with Purdy & Henderson, Chicago, Ill. *Chicago, Ill.*

Robert C. Stevens, (Mechanical). A.B., '94. M. Am. Soc. M. E. M. Ind. Eng. Soc. M. Indianapolis Technical Club. Mech. Eng. Atlas Engine Wks., Indianapolis, '95-8. Instr. Mech. Eng. U. of M., '98-9. Consulting Engr. Giddings & Stevens, Rockford, Ill., '99-'01. Mech. Engr. Atlas Engine Wks., '01-'05. Chief Engr. Atlas Engine Works, '05 to date. *2037 Ashland Ave., Indianapolis, Ind.*

Wellington C. Tate, (Electrical). Supt. Const. Ohio Penitentiary. Supt. Newberry Water & Light Co., '97-'00. Do. Munising Elec. Light & Power Co., '00-'04. Supt. Electric Power Dept. Munising Paper Co., '04-'05. *Munising, Mich.*

†Nelson J. Tubbs, (Civil). *Dexter, Mich.*

Frank F. Van Tuyl, (Electrical). M. Detroit Eng. Soc. With Gilbert Wilkes, '95-6. Bissel, Dodge & Erner Co., Toledo, '97-8. B. J. Arnold, Chicago, '98. Electrician, Det., Ypsilanti & Ann Arbor Ry., '98-'00. Do. Washtenaw Electric Co., '00-'01. Treas. and Mangr. Gilbert Wilkes & Co., '01-2. Asst. Treas. Kokomo Ry. & Light Co., '01-2. Gen. Mangr. Owosso & Corunna Elect. Co., '02-4. Consult. Engr., '02 to date. *1112 Union Trust Bldg., Detroit, Mich.*

Vance P. Wilkins, (Civil). D'ftsman to City Engr., Akron, O. Asst. Engr. St. L. & S. W. R. R. *Texarkana, Tex.*

George B. Willcox, (Mechanical). M.E., '01. M. Am. Soc. M. E. M. Mich. Eng. Soc. Testing Engr. F. W. Wheeler & Co., '95. Engine Designer do., '96. Cons. Engr. and Patent Solicitor, Bay City, '97-'05. Instr. Mech. Engr. U. of M., '98, '00, '02. Mangr. Willcox Engineering Co. (Inc.), '05 to date. *Eddy Bldg., Saginaw, Mich.*

Homer W. Wyckoff, (Electrical). Supt. Const. Conduits for City Lighting, Detroit, '94. Do. Cen. Union Telephone Co., Toledo, '95. Ass't Engr. do., Chicago. Engr. Const. Conduits, Indianapolis, '96. *Chicago, Ill.*

1896.

Mortimer G. Barnes, (Civil). C.E., '01. M. Am. Soc. C. E. U. S. Insp. on Poe Lock, Sault Ste. Marie, Mich., '92-3. Asst City Engr., Ann Arbor, '94. U. S. Insp. on Poe Lock and Power House, '95-6. Princ. Asst. Engr. Lake Superior Power Co., '96-7. U. S. Surveyor, Birmingham Canal, Alabama, '97-8. Chf. Engr., Chandler-Dunbtr Power Co., Sault Ste. Marie, '98. Instrumentman U. S. Deep Water Ways, '98-9. U. S. Junior Engr. on design and construction, Ill. & Miss. Canal, '99-'04. U. S. Asst. Engr. do., '04-'05. U. S. Asst. Engr. Moline Lock and Dam, May, '05 to date. *1132 14½ St., Rock Island, Ill.*

WILLIAM C. BORST, (Electrical). A.M. (Univ. of Denver), '05. Engr. Corps D. & R. G. R. R., '96. Instr. Physics and Drawing, Man. Training H. S., '96 to date.
1900 Emerson St., Denver, Col.

†HARRY C. BUELL, (Mechanical).

WALTER J. CAHILL, (Civil). M. Western Soc. of Engrs. Rodman and Mas'ry Insp. Ill. Cent. R. R. Co., '96-7. Levelman Kankakee Drainage Com., '97. Rodman and Leveler, Chicago, Hammond & West. Ry., '97. Instrument man Ill. Cent. R. R., Road Dept., '97. Rodman, City of Chicago (Tunnels), '97-8. Asst. Engr. City of Chicago (Harbors), '98. Do. City of Chicago (Pumping Stations), '99. Do. City of Chicago (Gen'l Construction), '99-'00. Do. City of Chicago (Bridge Construction), '00-'01. Office Engr. Lydon & Drews Co. (Sub-structures, Dredging, Breakwaters), '01-'02. Treas. do., '02-'03. Treas. and Asst. Gen'l Mangr. Chicago & Great Lakes Dredge & Dock Co., '03-'05. 2nd Vice Pres't Great Lakes Dredge & Dock Co., '05 to date. *18 Gilpin Place, Chicago, Ill.*

WILLIAM A. CALDWELL, (Electrical). With Bell Tel. Co., '96-8. Missouri Edison Co., '98 to date. *St. Louis, Mo.*

*PHILIP R. COATES, (Electrical). D'ftsman, Merrimack Mfg. Co., '96-9. Died ....

BURNHAM S. COLBURN, (Civil). M. Detroit Eng. Soc. D'ftsman Detroit Bdge. & Iron Wks., '96-7 and '99-'00. Res. Engr. Victoria Jubilee Bdge., Montreal, '97-9. Sec'y and Treas. The Canadian Bdge. Co., Ltd., '00 to date.
215 Burns Ave., Detroit, Mich.

JOHN C. CONDON, (Electrical). D'ftsman Portage Lake Foundry & Mach. Co., '97-8. Do. Calumet & Hecla Mining Co., '98-9. Clerk First Nat'l Bank, Hancock, '99 to date.
732 Hancock St., Hancock, Mich.

JESSE I. CONKLIN, (Civil). U. S. Insp. Masonry, Sault Ste. Marie, '92-6. Overseer, Fort St. Philip, La., '96-7. Chief Insp., Plaquemine Locks, '97-'03. U. S. Asst. Engr. do., '03-5.
U. S. Engineer Office, Plaquemine, La.

MERRITT S. CONNER, (Electrical). Various Engineering positions with the Western Electric Co., Chicago, '96-'03. Chf. Engr. Stromburg-Carlson Telephone Mfg. Co., '03 to date.
18 Audubon St., Rochester, N. Y.

WILLIAM C. CORYELL, (Mechanical). Machinist M. C. R. R., '96-8. D'ftsman Baldwin Loco. Wks., '98. Do. L. S. & M. S. Ry. Do. Ohio Steel Co. Chf. D'ftsman with Carnegie Steel Co., Ohio Steel Works and Furnaces for four years. Now in Eng'g Dept. in charge of Testing, Carnegie Steel Co.
345 Scott St., Youngstown, Ohio.

FREDERICK R. CUTCHEON, (Electrical). Assoc. Am. Inst. E. E. Apprentice Chase Construction Co., '96. Do. Western Electric Co., '97. Dynamo Chief Operator, St. Paul Gas Lt. Co., '97-8.

Sergt. Co. G, 2nd U. S. Vol. Engrs., '98. Elect. Engr. St. Paul Gas Lt. Co., '99. Supt. Elect. Dept. do., '00 to date. Supt. Elect. Dept. Edison Elect. Lt. & Pr. Co., '00 to date. Gen. Supt. St. Croix Power Co., '06 to date.
1043 Hague Ave., St. Paul, Minn.

Fred A. Eckert, (Mechanical). Instr. Machine Shop, Chicago Manual Training Sch., '96-9. Supt. Northern Eng. Wks., '99 to date.
1090 Fourth Ave., Detroit, Mich.

Charles M. Eddy, (Mechanical). Supt. Meter Dept. The Toledo Traction Co., '96-8. Eddy & McColl, Elec. Engrs. and Contractors, '98-'05. Charles M. Eddy, Elec. Engr. and Contractor, successor to Eddy & McColl, to date.
819 Madison Ave., Toledo, Ohio.

Jay D. Edmunds, (Mechanical). M. Eng. Soc. U. of M. Chf. D'ftsman Chicago Screw Co., '98. Mech. Engr. Fischer Equipment Co. Edmonds & Metzel. Turner Brass Wks. Western Electric Co., '05-6.
4752 Prairie Ave., Chicago, Ill.

Charles W. Ellis, (Electrical). Bell Tel. Co., Chicago. Gas Engine Dept. Fairbanks, Morse & Co., Beloit, Wis. Westinghouse Mach. Co.
Pittsburg, Pa.

Richard D. Ewing, (Civil). Instr. Math., Ishpeming. Supt. Schools, Champion, Mich. Supt. Schools, Escanaba, Mich., '99-'01. With American Book Co., '01 to date.
The Colchester, Colorado Springs, Colo.

Thomas H. Ferguson, Ph.B., '95, (Civil). Asst. Engr. Pub. Light. Com'n, Detroit, '93-4 and '96-7. Contractor's Engr., Monongahela River Imp., '97. Examiner U. S. Patent Office, '98-'03. Patent Attorney. Gen. Elect. Co., Schenectady, N. Y., '03-'05. Patent Attorney, Chicago, '05 to date.
308 Dearborn St., Chicago, Ill.

John W. FitzGerald, (Mechanical). E.E. (Mass. Inst. Tech.), '97. Asst. Supt., Experimental Dept., Western Elec. Co., '97-9. FitzGerald-Marquardt Eng. Co., San Juan, Porto Rico, '99-'01. Gen. Mngr. Columbian Transfer Co., '01-'06. Annable-FitzGerald Eng. & Mfg. Co., '06 to date.
76 State St., Grand Rapids, Mich.

Burt L. Foster, (Mechanical). Machinist Solvay Process Co., Detroit, '97. Erecting Engr., The Marsden Co., Phila., '98. Insp. Simplex Ry. Appliance Co., Chicago, '98. D'ftsman Crane Elevator Co., Chicago, '99. Insp. Robert W. Hunt & Co., Chicago, '99 to date.
C/o Robt. W. Hunt & Co., Chicago.

Sergius P. Grace, (Electrical). E.E., '04. M. Am. Institute of E. E. M. Engrs. Soc. of Western Penna. Elec. Engr. Detroit Telephone Co., '96-8. Chf. Engr., New State Tel. Co. of Mich., '98-9. Do. People's Telephone Co. of New Orleans, La., '99-'00. Supt. Southwestern Bell Telephone Co., '00-'02. Chf. Engr. C. D. & P. Telephone Co. (Bell), Pittsburg, '02 to date.
416 7th Avenue, Pittsburg, Pa.

Albert E. Greene, Ph.B., '95 (Civil). Assoc. Mem. Am. Soc. C. E. M. Detroit Eng. Soc. Asst. U. of M., '96-7. D'ftsman Detroit Bdge. & Iron Wks., '97-9. Asst. Engr. Duluth, Masaba & Northern Ry., '99-'00. D'ftsman Canadian Bdge. Co., Ltd., '01-3. Asst. Prof. C.E., U. of M., '04 to date.
415 E. William St., Ann Arbor, Mich.

Dwight M. Guillotte, (Mechanical). With Master Mech. and Erecting Dept. Ann Arbor R. R. *Owosso, Mich.*

Paul Hamilton, (Civil). M. Am. Ry. Eng'g & Maintenance of Way Assoc. Junior Engr. U. S. River and Harbor Imp. Wk., '97-'00. Asst. Engr., Cleveland, Cincinnati, Chicago & St. Louis Ry., '00-'02. Engr., Maintenance of Way do., '02 to date.
C/o C. C. C. & St. L. Ry., Springfield, Ohio.

George H. Harrington, (Civil). Rodman Carter Oil Co., '97-8. Transitman do., '98-9. Foreman Gas Department do., '99-'00. Lease Foreman do., '00-'02. Asst. District Supt. do., '02 to date. *Pennsboro, W. Va.*

John S. Hoadley, (Civil). D'ftsman and Rodman T. & N. W. Ry., '97-8. Co. Surveyor Williams Co., Ohio, '98-'01. Asst. Engr. Cincinnati Northern R. R., '01 to date.
631 So. Washington St., Van Wert, Ohio.

Edward B. House, (Electrical). M.S., '04. Prof. Math., Colo. State Agl. Coll., '96-'05. Prof. Irrigation Eng. do., '05-6.
209 Remington St., Fort Collins, Colo.

Edwin D. Hoyt, (Mechanical). A.M. (Western Univ. of Penna.), '04. Instr. Man. Train., Jewish Train. Sch., Chicago, '90-3. Instr. Man. Train., Muskegon H. S., Mich., '96-7. Prin. Hackley Man. Train. Sch., Muskegon, '97-'00. Prin. First Ward Man. Train. Sch., Allegheny, Pa., '00-'06.
25 Clifton Avenue, Allegheny, Pa.

John W. Irwin, (Civil). City Engr. *Mt. Clemens, Mich.*

Hugh C. Jackson, (Civil). Asst. Engr. R. H. McConaghy, Newcastle, Pa., '95-6. D'ftsman Gillette Mfg. Co., Minneapolis, Minn. At present with Westinghouse, Church, Kerr & Co., Engrs. *118 W. 81st St., New York, N. Y.*

Julius Kahn, (Civil). C.E., '99. Mem. Am. Soc. C. E. M. Am. Soc. M. E. Mem. Mich. Engr. Soc. D'ftsman Union Bdge. Co., Athens, Pa., '96. Asst. Engr. Bushwick Iron Wks., Brooklyn, '97. D'ftsman Brooklyn Navy Yards, '97. Asst. Engr. C. W. Hunt Co., '98, '99. Chf. Engr. Sulphur Mines, Japan, '01, '02. Practicing Consulting Engr., Detroit, '03. Pres't and Gen. Mgr. Trussed Concrete Steel Co., Detroit, '03 to date.
Wayne Co. Bank Bldg., Detroit, Mich.

Albert L. Kalmbach, (Mechanical). D'ftsman, Ohio Steel Co.
Youngstown, O.

Hugh B. Kelly, (Civil). Rodman C. M. & St. P. Ry., '96. Asst. to various Chicago Surveyors, '96-'98. Axeman, Rodman, Asst. Engr. C. & N. W. Ry., '98-'02. Detailing and Checking, Purdy

& Henderson, Chicago, '02-4. Do. Ill. Steel Co., North Wks., Chicago, '04. Detailing, Ritter & Mott, Chicago, '04-5. Detailing and Checking, Purdy & Henderson, Chicago, '05. Detailing, Ritter & Mott, Chicago, June, '05 to date.
17 S. Humboldt St., Chicago, Ill.

GUY T. LAMONT, (Mechanical). Mgr. Lamont's Sash and Door Factory. *309 Columbus St., Bay City, Mich.*

*THOMAS B. LEE, (Civil). Died ....

THOMAS D. McCOLL, (Electrical and Mechanical). M. Univ. of Mich. Eng. Soc. Elec. Engr. Light and Power Co.; Chelsea. Do. Bissell, Dodge & Erner Co., Toledo. Eddy & McColl, Elec. and Mech. Engrs., '98-'05. Elect. Engr. Toledo Gas, Elect. & Heating Co., '05-6. *410 Sherman St., Toledo, O.*

GEORGE T. McGEE, (Civil). M. Am. Soc. Min. Engrs. Clerk and Leveller, Ill. and Miss. Canal (U. S. Gov't work), '92-5. Mining Engr., Moffet-Smith Mines, Leadville, Colo., '96-7. Do., De La Mar Gold Min. Co., Nevada. Do., Anaconda Copper Mining Co., Butte, Mont. Do., Great Boulder Perseverance G. M. Co., Kalgoorlie, W. Australia. Asst. Supt., Anaconda Copper Mining Co., '01-2. Supt., Gagnon Mine, Colorado Smelting & Mining Co., '03 to date. Asst. Supt., Butte & Boston Con. Mining Co., '03 to '06. Supt., Butte Copper Exploration Co., Jan. '06 to date. *Butte, Mont.*

GEORGE K. McMULLEN, (Electrical). M. Mich. Eng. Assoc. Special, Citizens Telephone Co., Grand Rapids, '96-7. Mngr., Business Furniture Co., Grand Rapids, '97-8. Sales Mngr., Fox Machine Co., '98-'06. *316 Fountain St., Grand Rapids, Mich.*

CARL R. MARQUARDT, (Mechanical). D'ftsman, Am. Shipbuilding Co., Cleveland, '96-8. FitzGerald-Marquardt Eng. Co., San Juan, P. R., '98-'00. In charge of all merchant marine, Bath Iron Wks., Bath, Me., '00-'02. Mech. Engr., Pacific Ice Co., San Francisco, Cal., '03. Do., E. L. Phillips & Co., New York City, '04. Gen'l Eng. Practice, '05.
420 Parrott Bldg., San Francisco, Cal.

CLYDE S. MASON, (Mechanical). D'ftsman, M. C. R. R. Shops. '96-9. Chf. D'ftsman M. C. R. R., '99-'00. Div. Engr., Lackawanna Steel Co., Buffalo, N. Y., '01-4. Chf. Engr., Retort Coke Oven Co., Cleveland, '04. Member of firm, Jepson, Mason & Co. (Experts in By-product Coke Oven Construction), '05 to date.
21 Erie Co. Bank Bldg., Buffalo, N. Y.

HERBERT W. MERRILL, (Mechanical). With Mitts & Merrill since graduation. At present Superintendent and Buyer.
1022 S. Jefferson St., Saginaw, Mich.

HARRY Y. MILLS, (Civil). *Toledo, O.*

GUY D. NEWTON, (Mechanical). D'ftsman, Julian Kennedy, Pittsburg, '99-'00. Chf. D'ftsman Penna. Malleable Co., '00-'01. D'ftsman Lorain Steel Co., '01. Do. Garratt & Cromwell Eng. Co., Cleveland, O., '01-2. Do. The Nat'l Supply Co., Toledo, '02 to date. *2424 Auburn Ave., Toledo, O.*

LEE L. NEWTON, (Civil). *Lake Linden, Mich.*

ARTHUR P. O'BRIEN, (Civil). Mngr. Amer. Luxfer Prism Co., '97-'06. *160 5th Ave., New York, N. Y.*

WALTER K. O'BRIEN, (Electrical). Chf. Engr. Am. Luxfer Prism Co., '96 to date. *160 5th Ave., New York, N. Y.*

HENRY B. OTIS, (Electrical). Telephone Co., '97. Amer. Luxfer Prism Co., '98. *973 Washington Blvd., Chicago, Ill.*

CHARLES G. PALMER, (Electrical). *Detroit, Mich.*

LEWIS M. PARROTT, (Electrical). Principal H. S. *St. Johns, Mich.*

JAMES M. RAIKES, (Civil). *1020 N. 6th St., Burlington, Ia.*

BEN C. RICH, (Civil). Instrument man C. H. & W. R. R., '96-8. Builder, '98 to date. *6540 Howard Ave., Chicago, Ill.*

WALTER ROBBINS, (Electrical). West. Elect. Co., '96-7. F. B. Rae Eng. Co., '97. Pierce and Richardson, '97-8. West. Elec. Co., '98. *C/o West. Elec. Co., Chicago, Ill.*

EDWARD J. RYAN, (Electrical). *211 W. Warren Ave., Detroit, Mich.*

RICHARD E. SACK, (Electrical). Edison Illum. Co. Light & Power Co., Albert Lea, Minn. *Albert Lea, Minn.*

GEORGE R. SNOVER, (Mining). Mining Engr. *San Juancito, Honduras.*

FRANK C. SOPER, (Electrical). Designer Amer. Luxfer Prism Co., '96-9. West Elec. Co., '99. *Chicago, Ill.*

CHARLES H. SPENCER, (Civil). M. Baltimore Engrs. Club. Asst. City Engr. Ann Arbor, '95-6. Rodman L. S. & M. S. Ry., '97. Transitman do., '98. Chief D'ftsman Southern Ind. Ry., '99. Do. B. & O. R. R., '00-'02. Asst. Engr. do., '03. Res. Engr. in charge of Terminal Imp., Washington, D. C., '03 to date. *55 U St., Washington, D. C.*

WILL T. STEBBINS, (Electrical). Ship Bldg. & Dry Dock Co. *Newport News, Va.*

ADRIAN D. STEVENSON, (Electrical). Journalism. *Detroit, Mich.*

FRANKLIN V. V. SWAN, (Electrical). Manual Training Director and Electric Lighting Contractor, Flint, '99-'02. Telephone Engr. Western Electric Co., Chicago, '02-6. *429 East St., Flint, Mich.*

GEORGE W. TANNER, (Electrical). Instr. St. John's Sch. *Salina, Kan.*

WARREN H. THOMPSON, (Mechanical). M. The C. E. Club of Cleveland. Machinist The Brown Hoist. Mach. Co., '96-'00. Erector for do., '00-'05. D'ftsman do., '05 to date. *1588 E. 82nd St., Cleveland, O.*

CHARLES H. VAUGHAN, Ph.B. (Hillsdale), (Civil). D'ftsman, Halsted St. Iron Wks., '96. Do. Riter-Conley, '97. Construction Engr. Penn. Bridge Co., '97 to date. *400 13th St., New Brighton, Pa.*

HARRY C. WEARE, (Mechanical). Moulton Starrett Co., '96-7. Engr. Amer. Luxfer Prism Co., '97-9. Supt. Thompson, Starrett Co., '01-4. Erection Supt. John Peirce Co., '04-6.
277 Broadway, New York, N. Y.

LAVERGN L. WHEELER, (Electrical). Dairy Farming.
Parma, Mich.

†FRANK S. WHITMAN, (Civil). ***Buchanan, Mich.***

CARL B. WILLIAMS, (Civil). Engr. on Constr., Williams Construction Co., '96-'00. Engr. on Water Imp., City of LaSalle, Ill. '03. City Engr., Western Springs, Ill., '03-5. Res. Engr. Indiana Harbor R. R., '05-6. Sub. Instr. man, Sanitary Dist., Chicago, '06. *155 LaSalle St., Chicago, Ill.*

VICTOR R. WILLOUGHBY, (Mechanical). Solvay Process Co., '96-7. D'ftsman Mich. Penin. Car Co., '97. Chief D'ftsman Amer. Car and Foundry Co. (Western Mech. Dept., St. Louis, Mo.), '98-'00. Asst. to Mech. Engr. A. C. & Fdy. Co., St. Charles, Mo., '00-'05. Mech. Engr. A. C. & Fdy. Co., Jeffersonville, Ind., '05 to date. ***Jeffersonville, Ind.***

LOUIS A. WOODARD, (Mechanical). M. Am. Soc. of M.E. Preferred Appren. & D'ftsman, L. S. & M. S. Ry., '96-8. D'ftsman Ohio Steel Co., '98-9. Asst. Engr. National Steel Co., '99-'01. Works Mngr. & Asst. Gen'l Mngr. Wm. Tod Co., '01 to date.
C/o Wm. Tod Co., Youngstown, O.

SILAS H. WOODARD, (Civil). M. Am. Soc. C. E. Rodman Arthur McMullen & Co., '96-7. D'ftsman Purdy & Henderson, '97. Do. Dutton Pneumatic Lock Co., '97-8. Computer U. S. Board of Engrs. on Deep Waterways, '98-'00. Do. Isthmian Canal Com'n, '00-'02. Asst. Engr. A. Noble, Consulting Engr., '02. Office Engr. P. N. Y. & L. I. R. R. Co., '02-4. Res. Engr. do., '04-6.
Rm. 1104, No. 1 W. 34th St., New York, N. Y.

*EDWIN F. WOODRUFF, (Mechanical). Supt. J. S. Stearns Lumber Co., Odanah, Wis. Act. Asst. Engr. U. S. N. Died at Ludington, June, '98.

GROVER H. WOODS, (Electrical). State Insp. Pub. Wks., '96-8. Elec. Engr. Syracuse Const. Co., '98 to date. ***Syracuse, N. Y.***

HENRY L. WOOLFENDEN, (Electrical). M.S., '97. E.E., '04. M. Colo. Branch Am. Inst. E. E. Asst. to Gilbert Wilkes, Consulting Engr., '97-9. Junior partner, Gilbert Wilkes & Co., '99-'00. Treas. Gilbert Wilkes & Co., Inc., '00-'01. Pres't do., '01-5.
1649 Tremont St., Denver, Colo.

1897.

FRED L. BAKER, (Mechanical). M. Western Railway Club. Machinist M. C. R. R., Jackson, '97-8. D'ftsman Am. Loco. Co., Schenectady, '98-'99. Chief D'ftsman Pressed Steel Car Co., Pittsburg, Pa., '00-'01. D'ftsman and Engr. Standard Steel Car

Co., Pittsburg, '02-3. D'ftsman and Erecting Work, '03-4. D'ftsman and Inspector Whiting Fdy. Equipment Co., Harvey, Ill., '04-5. Mech. Engr. Streets Western Stable Car Line, Chicago, '06 to date. *15428 Turlington Ave., Harvey, Ill.*

ARK BARY, (Electrical). M. Am. Soc. M. E. M. St. Louis Engrs. Soc. Asst. Mich. Electric Co., '97. Levelman U. S. Survey, '97. Asst. Engr. Bryan & Humphrey, '98-'00. Engr. Laclede Power Co., '00. Do. H. H. Humphrey, '00-'04. Do. Bary & Schreiber, '04 to date. *723 Mermod & Jaccard Bldg., St. Louis, Mo.*

RTHUR W. BIRDSALL, (Electrical). D'ftsman Wellman-Seaver Co., Cleveland, '98-9. Do. E. H. Dyer & Co., Cleveland, '99-'00. D'ftsman and Inspector Am. Steel & Wire Co., Cleveland, '00-'01. D'ftsman Northern Eng'g Works, Detroit '01-'03. Do. Weil & Van Tuyl, '03-4. Asst. Engr. Field, Hinchman & Smith, '04 to date. *832 Humboldt Ave., Detroit, Mich.*

EWARD A. BRITTEN, (Electrical). Elect. Lighting U. of M., '98. Mich. Elect Co., Detroit, '98-9. With D. Y. & A. A. Ry., '99. With Seidler & Miner Elec. Co., '00-'02. Secy. & Treas. Britten & Haines Elec. Co., Detroit, '02-6. Prest. United Construction Co., '06. *1327 Vermont Ave., Detroit, Mich.*

REDERICK H. BURDICK, (Civil). Erection Engr. The Riter-Conley Co., '97-'04. Member of Mich. Paving Brick Co., Supt. of Plant since '04. *Center St., Omer, Mich.*

ELANCTHON W. CAMPAU, (Mechanical). With Gilbert Wilkes. D'ftsman Dry Dock Co. Naval Reserves, U. S. S. Yosemite. *Detroit, Mich.*

ALPH COLLAMORE, (Mechanical). M. Am. Soc. of Heating & Ventilating Engrs. M. Detroit Eng. Soc. D'ftsman Field & Hinchman, '97-'01. Asst. Engr. do., '01-3. Secy. Field, Hinnchman & Smith, involving the practice of Consulting Engineering in Mechanical and Electrical work, '03 to date. *25 Hancock Ave., W., Detroit, Mich.*

MMONS COLLINS, (Electrical and Mechanical). D'ftsman, Whiting Fndry. Equipment Co. *115 Monroe St., Chicago, Ill.*

HARLES COTTINGHAM, B.C.E. (Purdue). C.E. City Engr. *Danville, Ill.*

ILBERT S. DREW, (Mechanical). Life Member U. of M. Eng. Soc. Instr. in Forging, Toledo Man. Train. School, '97-8. Arch. D'ftsman, '98-9. Instr. in Machine Work, Univ. High School, Chicago, '00-'06. Supt. Man. Train. and Trade Schools, Ill. State Reformatory, '06 to date. *Illinois State Reformatory, Pontiac, Ill.*

LMER M. ELLSWORTH, (Civil). Recorder U. S. Deep Waterways Survey, '97-9. Asst. Engr. Chicago & Alton R. R., '99-'00. Instr. man St. Clair Flats Survey, '00-'02. Asst. Engr. Cambria Steel Co., '03-4. Do. Bush Terminal Co., '05 to date. *575 Dean St., Brooklyn, N. Y.*

THADDEUS L. FARNHAM, (Mechanical). Engine Erector Fairbanks, Morse & Co., '97-'00. Constructing Engr. Ford Plate Glass Co., '00-'01. Estimator Whiting Fdy. Equip. Co., '01-2. Salesman do., '02-4. Salesman Platt Iron Works Co., '04-6. *1667 Frick Annex, Pittsburg, Pa.*

HENRY GEISMER, (Civil). Leveler Birmingham Canal Survey, '97. Surveyor Sloss Iron & Steel Co. Asst. Engr. Tallassee Falls Mfg. Co. *Tallassee, Ala.*

MELVIN A. GILBERT, (Civil). M. Engrs. Soc. of Western Penna. D'ftsman Riter-Conley Mfg. Co., Allegheny, Pa., '98-9. Do. Schiffler Bdge. Co., '99. Checker and Squad Foreman, Riter-Conley Mfg. Co., '99-'04. Checker Penna. Bdge. Co., '04 to *3326 Fourth Ave., Beaver Falls, Pa.*

HENRY T. HARRISON, (Electrical). D'ftsman Wellman-Seaver Eng. Co., '98-'00. Do. Am. Steel & Wire Co., '00-'01. Do. Garrett, Cromwell Eng. Co., '01-2. Mech. Engr. Osborn Eng. Co., '02 to date. *Suite 5, The Belgrave, Cleveland, O.*

FREDERICK W. HENNINGER, (Electrical).

LOOMIS HUTCHINSON, (Electrical). Testing Boilers. D'ftsman Sterling Boiler Co. U. S. S. Yosemite. *Barberton, O.*

CARLYLE KITTREDGE, (Electrical). With Bissel, Dodge & Erner, Toledo, '97. Asst. Engr. F. M. Dunlap, Detroit, '98. Supt. Elect. Lt. & Power Co., Van Wert, O., '00. Asst. Engr. Central Union Telephone Co., '99 to date. *211 Saks Bldg., Indianapolis, Ind.*

JOHN G. LEWIS, (Electrical). *424 North Oak Park Ave., Chicago (Oak Park).*

ELMER D. LYON, (Mechanical). D'ftsman Standard Boiler & Bdge. Co., Bellaire, '97-8. Do. Metrop. Elev. R. R., Chicago, '98-9. Salesman Amer. Blower Co., Detroit. D'ftsman Whiting Foundry & Equipment Co., Harvey, Ill., '00-'03. Do. Bucyrus Co., S. Milwaukee, Wis., '03-'05. Do. Allis Chalmers Co., Milwaukee, '05 to date. *375 20th Ave., Milwaukee, Wis.*

WILLIAM F. MARTIN, (Mechanical). With Eng. Dept. A. T. & S. F. Ry. Co., '97-'00. Designer The Scherzer Rolling Lift Bdge. Co. '00 to date. *232 S. Central Park Ave., Chicago, Ill*

THOMAS F. MCCRICKETT, (Mechanical). M. Am. Soc. M. E. M Detroit Eng. Soc. D'ftsman Bay City Ind. Wks., '95-6. Engr Russel Wheel & Foundry Co., '97 to date. *Plaza Hotel, Detroit, Mich*

J. HAROLD MONTGOMERY, (Electrical). M.S., '98. M. Detroit Eng Soc. Owner Mich. Apparatus Co., Ann Arbor, '98-'01. Ass Engr. Field, Hinchman & Smith, '01-4. State Elec. Inspecto Mich. Inspection Bureau, Detroit, '04 to date. *401 Wayne Co. Bank Bldg., Detroit, Mic*

HENRY E. MOORE, (Civil). Asst. Engr. Bdges. and Bldgs. C. & W M., & D. G. R. & W. R. R., '97-'00. Eng. of Bdges. and Stru tures, Algoma Central Ry., Sault Ste. Marie, Canada, '00-'o 1.

D'ftsman Riter-Conley Mfg. Co., Pittsburg, '01-2. Do. Milliken Bros., New York City, '02. Engr. Riter-Conley Mfg. Co., New York City, '02-4. New York Mngr. do., '04 to date.

111 Broadway, New York City, N. Y.

Yman F. Morehouse, (Electrical). A.M., '04. M. Am. Physical Soc. Instr. in Phys. and Chem., Marquette H. S., '97-'00. Graduate Student Univ. of Chicago, Summer of '00. Instr. in Math. Detroit Central H. S., '00-'01. Asst. in Elec. Engr. U. of M., '01. Instr. in Phys. Wash. Univ., St. Louis, '01-2. Instr. in Physics U. of M., '02-'06. Practical work in Elec. Eng. and graduate work in Physics during Summers from '01 to date. Asst. Prof. in Elec. Eng'g, '06.

923 Greenwood Ave., Ann Arbor, Mich.

Harles H. Moritz, (Electrical). M. Electro-Chemical Soc. Assoc. M. Am. Inst. E. E. Do. Am. Soc. C. E. Do. Canadian Soc. C. E. D'ftsman Valley Tel. Co., Saginaw, '97-8. Insp. Mich. Lake Superior Power Co., Sault Ste. Marie, '98-9. Asst. Engr. Shawmigan Water & Power Co., Shawmigan Falls, '99-'01. Constr. Engr. Pittsburg Reduction Co., Niagara Falls, '01-3. Asst. Supt. do., '03-4. Supt. Northern Aluminum Co., Shawmigan Falls, '05. U. S. S. Yosemite, '98. Supt. Niagara Works, The Pittsburg Reduction Co., '06.

315 Buffalo Ave., Niagara Falls, N. Y.

Villiam F. V. Neuman, (Electrical). Lineman Elect. Rd. Do. Chase Constr. Co., Detroit. Mangr. Wm. E. Metzger's Automobile Repository, '01 to date. Spent two summers as Harbor Inspector on Lake Michigan. At present, Sales Mngr. Soules Motor Car Co., and Local Mngr. Welch Motor Car Co., with headquarters at 736-740 Woodward Ave., Detroit.

147 Delaware Ave., Detroit, Mich.

Oseph Perrien, B.S. (Mich Agr. Coll.), (Mechanical).

440 Brush St., Detroit, Mich.

Eorge C. Pratt, (Electrical). Supt. Barrington Elect. Light Co., '97-8. Audit. Dept. West. Elect. Co., '98-9. Mngr. do., '99 to date. *Chicago, Ill.*

Villiam H. Ripley, (Civil). M. U. of M. Eng. Soc. M. Detroit Eng. Soc. Recorder U. S. Survey, Birmingham Canal, '97. Asst. Engr. Birmingham Traction Co., '98. D'ftsman Keystone Bdge. Works, Pittsburg, '99. Do. Shiffler Bdge. Co., Pittsburg, '00-'01. Do. Toledo Branch Am. Bdge. Co., '02-3. Engr. and D'ftsman Trussed Concrete Steel Co., Detroit, '03-'06. Designing Engr. Mansfield Eng. Co., '06 to date.

2848 Northwestern Ave., Indianapolis, Ind.

Rederic C. Roberts, B.S. (Earlham), (Civil). *W. Elkton, O.*

Francis J. Seabolt, (Mechanical). L.L.B. (Nat'l Univ., Washington, D. C.), '04. M.E., '06. With Stephenson Mnfg. Co. Post Graduate U. of M., '99-'00. D'ftsman N. Y. Ship Building Co., Camden, '00-'01. Examiner U. S. Patent Office, Washington, Frederick C. Borst, (Mechanical). Special Apprentice, Mech. Dept., Denver, Rio Grande R. R., '98-'01. Roadhouse Foreman do., '01. D'ftsman do., '01-2. Chief D'ftsman do., '02-3. Member of Mech. Engr's Staff, Telluride Power Co., '03-4. Chief D'ftsman, Denver & Rio Grande R. R., Mech. Dept., '05 to date. *1900 Emerson St., Denver, Colo.*

Thomas A. Bragg, (Mechanical). Erect. Engr. New Era Iron Wks. Co. *Dayton, O.*

Irving J. Brown, (Electrical). D'ftsman, Brown Hoist. & Mach. Co. Do. Kilby Mfg. Co. *Cleveland, O.*

Roy W. Brown, (Electrical and Mechanical). *Geneseo, Ill.*

John W. Byers, (Electrical). Student Harvard Univ., '98-9. *Cambridge, Mass.*

Charles O. Cook, (Mechanical and Electrical). M. Civil Engr's Soc., St. Paul. D'ftsman, Variety Iron Works, '98. Do. Kilby Mfg. Co., '99. Supt. Long Distance Dept., Mich. Telephone Co., '99-'01. With Solvay Process Co., '01-'03. Asst. to Chief Engr., North Western Fuel Co., '03-5. Manufacturers Agt., July, '05 to date. *601 Majestic Bldg., Detroit, Mich.*

*Edward B. Coolidge, (Electrical). Student Mass. Inst. Tech., '98-9. Died in August, 1900, at Detroit, Mich.

Sollace B. Coolidge, (Electrical). Agt. Beaumont & Chauncy Coal Co., '98-'00. Jobber in Coal, S. B. Coolidge Coal Co., '00-2. Vice Prest. The Young-Maurer Co., '02-6. Sec'y The Wabash Coal Co., '02-6. *1721 82nd St., N. E., Cleveland, O*

Leonard P. Coulter, (Electrical). Assoc. Mem. Am. Inst. E. E Meter Insp. Diamond Meter Co., Peoria, Ill., '98-9. D'ftsman Cutler Hammer Mfg. Co., Milwaukee, '99-'01. Chf. D'ftsma do., '01-3. Elec. Engr. do., '03 to date. *673 28th St., Milwaukee, Wi*

John S. Cowgill, (Electrical). M. Am. Inst. E. E. Dynamo an Motor Tester, Western Electric Co., '98-9. Constr. Engr. do '99-'00. D'ftsman do., '00-'01. Designing Elec. Engr. do., '00- Chf. Elec. Engr., Fairbanks-Morse Co. (Three Rivers Elec Co.), '04 to date. *510 West St., Three Rivers, Mic*

Faust F. Crampton, (Electrical). Asst. Exam. Patent Office. *Washington, D. C*

Henry W. Daniels, (Civil). Supt. of Schools, Newaygo, '98-'o Do., St. Louis, '00-'05. Instr. in Chemistry, Pomona Colleg '05-6. *Third St., Claremont, Ca*

Isaac De Young, (Civil). M. Univ. of Mich. Eng. Soc. Instru mentman and D'ftsman C. C. C. & St. L. Ry., '98. Insp. M. I S. P. Co., '98-9. D'ftsman, Algoma Central Ry., '99. Insp. M L. S. P. Co., '99-'01. Asst. Engr. do., '01. Junior Engr. U. Gov't, '01-6. *414 Dawson St., Sault Ste. Marie, Mic*

Amos F. Everett, (Civil). U. S. Deep Waterways Survey, '98. *Lansing, Mic*

OWARD FELVER, (Mechanical). Instr. Math., Marinette, Wis., H. S., '98-9. Mngr. Felver Creamery Co., '99-'01. Inspecting and Erecting Structural Steel, Variety Iron Works Co., '01-4. D'ftsman, Designing and Estimating do., '04 to date.
1201 E. 81st. St., N. E., Cleveland, O.

OBERT M. FOX, (Civil). M. Detroit Eng. Soc. Computer, U. S. Deep Waterways Survey, '98. Asst. Engr., Maintenance of Way, D. G. R. & W. and C. & W. M. R. R's. (now Pere Marquette), '99-'00. Asst. Bridge Engr. M. C. R. R., '00 to date.
84 Prentis, Detroit, Mich.

RANK A. FUCIK, (Mechanical). D'ftsman, Ill. Steel Co., Chicago, '98-9. Instr. Mech. Drawing, Chicago Public Schools, '99-'02. Instr. Mech. Drawing, R. T. Crane H. S., Chicago, '02-5.
731 S. Sawyer Ave., Chicago, Ill.

RANCIS F. GILLEN, (Civil). Recorder U. S. Deep Waterways Survey, '98. Insp. Mich. Lake Superior Power Co., '98-9. Junior Engr., U. S. Engr. Dept. Office, P. B. & G., '99-'00. U. S. Asst. Engr. do., '00 to date.
1729 New York Ave., Washington, D. C.

EON GOLDSMITH, (Electrical). M. Am. Soc. E. E.; M. N. A. S. E. With Chicago Edison Co., '98-9. With Southwark Fdy. & Machine Co., '99-'03. Salesman Westinghouse Elec. & Mfg. Co., at present. *11 Pine St., New York City, N. Y.*

RNEST P. GOODRICH, (Civil). C.E., '01. M. Am. Soc. C. E. M. Nat'l Geographical Soc. Structural Designer Edison Elec. Co., Detroit, '98. Eng'g Asst., Dept. Public Bulgs. and Grounds, War Dept., Washington, D. C., '98-9. Civil Engr. (Lieut. J. G.) U. S. Navy at New York Navy Yard, '99-'02. Chf. Engr. The Bush Co., Ltd., Bush Terminal Co., Bush Terminal Ry. Co., '02 to date. Consulting Engr., firms in New York City, New Orleans, Detroit, Cleveland, St. Louis, Philippine Islands, Valparaiso, Chili., '04 to date. Chief Engr. Bush Land Co.
47 Pierrepont St., Brooklyn, N. Y.

RED M. GREEN, (Mechanical). Assoc. Mem. Am. Soc. C. E. D'ftsman Detroit Heat. & Light Co., '91-2. Do. Elect. Wks., '93. Do. Frontier Iron Wks. Do. Russel Wheel & F'dry Co., '95-6. Insp. Mich. Lake Superior Power Co., '98-9. U. S. Asst. Engr., Office of Public Bldgs. and Grounds, Washington, D. C., '00. Instr. in Civil Engr. U. of M., '00-'02. Structural D'ftsman Cambria Steel Co., '02-3. D'ftsman P. N. Y. & L. I. R. R. Co., '03-4. Office Engr. do., '04-6.
1 West 34th St., New York, N. Y.

ARRY E. HARRINGTON, (Electrical). Cable Testing Dept., Western Elect. Co., Chicago, '98-9. Equipment Dept., Chicago Telephone Co., '99. Equipment Dept., Mich. Telephone Co., Grand Rapids, '00-2. Local Traffic Mngr. do., '02-4. District Switchboard Insp. do., '04-5. Eng'g Dept., Mich. State Telephone Co., '05-6.
183 Medbury Ave., Detroit, Mich.

Archie L. Harris, (Civil). D'ftsman, U. S. Deep Waterways Survey. Do. N. Y. State Barge Canal Survey, Albany, '00-'01. Do. U. S. Isthmian Canal Com'n, Washington, D. C., '01. Do. Russel Wheel & F'dry Co., Detroit, '01-2. Do. Penn. R. R., New York, '02-3. Asst. Engr. U. S. Reclamation Service, Arizona, '03-6. *Roosevelt, Arizona.*

Le Roy M. Harvey, (Electrical). M. Western Railway Club. M. Engr's Soc. of Milwaukee. M. Am. Inst. of E. E. Testing Dept. Westinghouse Elec. Mfg. Co., '98-9. Head, Testing Dept., Siemens & Halske Elec. Mfg. Co., '99-'00. Salesman Northern Elec. Mfg. Co., '00-'04. Do. Allis Chalmers Co., Chicago, '04-5. Mngr. Milwaukee Dist. Office, Allis Chalmers Co., '06. *718 Farwell Ave., Milwaukee, Wis.*

Percy M. Holdsworth, (Mechanical). Testing Dept. Fairbanks, Morse & Co. Motive Power Dept. Atl. Coast Line R. R., '99-'02. Do. PeCos System, '04-'05. Do. Missouri Pacific, '05 to date. *3832 Shenandoah St., St. Louis, Mo.*

Edward P. Marsh, (Mechanical). M. Western R. R. Club. Insp. New Equipment C. & N. W. Ry., '98-'03. Foreman Pass. Shop do., '03 to date. *203 S. Kenilworth Ave., Oak Park, Ill.*

William J. Marsh, (Electrical). *Pittsford, N. Y.*

Howard B. Merrick, (Civil). Masonry Insp. G. N. Ry., '98. Leveler do., '98. Asst. Engr. do., '98-'02. Supt. of Drills, E. J. Longyear & Co., '02-3. Instr. in Surveying U. of M., '03-'06. Assistant Professor of Surveying, '06. *928 Church St., Ann Arbor, Mich.*

Herbert A. Moody, (Mechanical). Junior Mem. Soc. M. E. D'ftsman Morton Mfg. Co., Muskegon, '98-9. Do. Central Paper Co., Muskegon, '99-'00. Engr. on Const., Union Bag & Paper Co., Sandy Hill, N. Y., '00-'04. Resident Engr. Cherry River Paper Co., Richwood, W. Va., '04-5. Mem. of firm, Fairbanks & Moody, 150 Nassau St., New York City, '04 to date. *Richwood, W. Va.*

Fred W. Newell, A.M. (Bates), (Electrical). With Elwell-Parker Elect Co., '98 to date. *Cleveland, O.*

Claude G. Newton, (Civil). U. S. Deep Waterways Survey, '98. D'ftsman Genl. Elec. Co. Do. Milwaukee Bdge. Wks. *Milwaukee, Wis.*

Ralph E. Newton. C.E., '01, Assoc. Mem. Am. Soc. C. E. D'fts-man Wisconsin Bdge. & Iron Co., '98-'00. Structural Eng[illegible]. Boston and Montana Consolidated Copper and Silver Mini[illegible]g Co., '00-'01. Asst. Engr. Wisconsin Bdge. & Iron Co., '02. Pre[illegible]ident Newton Engineering Co., '03 to date. *Box 1098 Milwaukee, W[illegible]s*

Joseph H. Petterscн, (Mechanical). D'ftsman Gates Iron W[illegible]s. '98. Do. Fraser & Chalmers, '98-9. Died June 23, 1903.

Otto Pruessman, (Electrical). Telephone Eng. Western Elect. C[illegible]o. '98 to date. *1484 Roscoe St., Chicago, [illegible]ll*

DWARD H. RAVENSCROFT, (Civil). D'ftsman, R. Modjeski, Cons. Engr., '98-'02. Mngr. do., '02-'05. Pres't Steelstone Construction Co., '05-6. *1761 Monadnock Bldg., Chicago, Ill.*

LARENCE W. RAYNOR, (Civil). Assoc. Mem. Am. Soc. C. E. M. C. E. Soc., St. Paul, Minn. Leveler, Detroit & Lima Northern Ry., '97. D'ftsman, B. R. & P. Ry., '98-9. Asst. Engr. do., '99. Junior Engr., War Dept., '99-'01. Contracting Agt., American Bridge Co., '01. Junior Engr., War Dept., '01-'02. 1st Asst. Engr., Midland Bridge Co., Kansas City, '02-4. Propr. and Consulting Engr., Western Eng'g Co., Denver, '05 to date.
407 Jackson Block, Denver, Colo.

ERBERT L. RUSSELL, (Civil). M. Mich. Technic. M. Detroit Eng. Soc. D'fting, Wisner's Patent Office, '98-9. Asst. Engr. Grand Trunk Ry., '99-'04. Engr. in charge of Construction, Central Heating Co., '04-'05. Partnership, French & Russell, Civil and Consulting Engrs., '05 to date. *1018 Fourth Ave., Detroit, Mich.*

AMES T. ST. CLAIR, (Electrical). B.S., M.E., '99. Junior, Am. Soc. Mech. Eng. D'ftsman, Am. Car & F'dry Co., Detroit, '99-'02. Chf. D'ftsman do., '02-'05. Consulting Engr. do., St. Louis, Mo., '05 to date.
C/o American Car & Fdy. Co., St. Louis, Mo.

FRANK N. SAVAGE, (Civil). With Chicago Edison Co. Grad. Student U. of M., '98-9. *Ann Arbor, Mich.*

LOYD B. SMITH, (Civil). M. Am. Soc. of C. E. D'ftsman, Paige Iron Works, '98. D'ftsman, Mo. Valley Bridge & Iron Works, '98-'04. Vice Prest. and Chief Engr. The Topeka Bridge & Iron Co., '04 to date. *1413 Harrison St., Topeka, Kansas.*

LARENCE W. SQUIER, (Electrical). Elect'n, G. W. Jones Electric Co., '98. Testing Dept., Elwell-Parker Elect. Co., '99. D'ftsman, E. H. Dyer & Co., '99. Designing Engr., Sprague Elect Co., '00-'02. Designer, Gen. Elect Co., '02-'05. Elect. Engr., Westinghouse Elect. Co., '05-6.
40 Moreton Ave., Stretford, Manchester, England.

OBERT STECK, (Electrical). M. Am. Inst. E. E. Asst. to C. A. Pratt, Cons. Engr., '98-9. Eng. Dept. Western Elec. Co., '99-00. Asst. Supt. Fire Extinguisher Mfg. Co., '00-'01. Eng. Dept. Western Elec. Co., '01 to date.
1520 Wolfram St., Chicago, Ill.

OHN F. STREIB, (Civil). Rodman and Recorder, U. S. Deep Waterways Com., '98-9. D'ftsman, Gen'l Elect. Co., '99. Do. Pressed Steel Car Co., '99-'00. Checker do., '00-'02. Chf. D'ftsman do., '02-3. Mech. Engr. do., '03 to date.
719 Taylor Ave., Avalon, Pa.

LAUDIUS H. THOMAS, (Mechanical). D'ftsman, Roe Stephens Mfg. Co., Detroit, Mich., '98-'03. Sec'y and Treas., Gilbert Wilkes & Co., Denver, Colo., '03-5. *435 17th St., Denver, Colo.*

Howard P. Treadway, (Civil). Assoc. Mem. Am. Soc. C. E. Asst. Surveyor, Old Dominion Copper Min. and Smelting Co., Globe, Ariz., '98-9. Contr. Engr., Wrought Iron Bdge. Co., Kansas City, Mo., and Omaha, Nebr., '99-'01. Do. Am. Bdge. Co., '01-2. Vice-Pres't and Treas., Kansas City Bdge. Co., '02 to date.
1108 E. 15th St., Kansas City, Mo.

Sutton Van Pelt, (Civil). Assoc. Mem. Am. Soc. C. E. M., W. S. E. Stadiaman, U. S. Deep Waterways Survey, '98. Insp. Mich. Lake Superior Power Co., '98-'01. Insp. and Jun. Engr. U. S. Eng. Dept., Alabama, '01-'05. Junior Engr. U. S. Eng'g Dept., The Soo., '05 to date.
425 Cedar St., Sault Ste. Marie, Mich.

Albert A. Weber, (Mechanical). Student in Medicine, U. of M.
Ann Arbor, Mich.

Morey A. Wood, (Mechanical). Instr. Math. *Burlington, Ia.*

Fay Woodmansee, (Electrical). M. Am. Inst. of E. E. D'ftsman, Gen'l Elect. Co., Schenectady, N. Y., '99-00. Engr. do., '00-'03. Elect. Engr., Sargent E. Lundy. Engr., 1720 Ry. Exchange, Chicago, '03 to date. *430 S. 18 Ave., Maywood, Ill.*

1899.

Emanuel Anderson, (Mechanical). D'ftsman, J. S. Metcalf Co., Chicago, '99. With Sargent & Lundy, Engrs., '00.
Chicago, Ill.

James C. Armstrong, (Electrical and Mechanical). With Alaska Explor. Co. *Nome City.*

Frederick E. Arnold, (Mechanical). D'ftsman, Whiting F'dry Equipment Co., '99-'01. Salesman do., '01-5.
528 E. 6th South St., Salt Lake City, Utah.

Norwood B. Ayers, (Electrical). Asst. Master Mech., Cudahy Packing Co. *Kansas City, Mo.*

William P. Baker, (Electrical). Erect. Dept. Gates & Randolph, Chicago. D'ftsman, Genl. Elect. Co. *Schenectady, N. Y.*

John W. F. Bennett, (Civil). Instrumentman, Lake St. L. Road Extension, Chicago, '99. Timekeeper, Asst. Supt. and Supt. of Constr., Thompson-Starrett Co., New York and Phila., '99-'04 - Constr. Engr., Waring-White Bldg. Co., London, England. 'o to date. *25 Dorce St., Piccadilly, London W., England* -

James R. Bibbins, (Electrical). Assoc. Am. Inst. E. E. Jun. Am Soc. Mech. E. Past Member Detroit Eng. Soc. D'ftsman, De troit Edison Co., '99. Operating Electrician, Public Ligh Com'n. Detroit, '00. Asst. Engr., Detroit Edison Co., '01. Ass Elec. Engr., Detroit United Rys., '02. Technical Writer, Wes inghouse Co. With Westinghouse Machine Co. at present.
226 East End Ave., Pittsburg. P

Joseph A. Bursley, (Mechanical). Special Apprentice, Penns vania Co., '99-'02. Instr. in Mech. Eng., U. of M., '04 to da
1224 Washtenaw Ave., Ann Arbor, Mic

AVID F. CASTILLA, (Mechanical). D'ftsman with Foundry Co. *Monterey, Mex.*

ILLIAM G. CHESEBROUGH, (Mechanical). D'ftsman, Northern Eng'n Wks., '99-'02. Salesman, Brown & Zortman Mach. Co., Pittsburg, Pa., '02-4. Sales Engr., Northern Eng'g Wks., '04 to date. *165 Lincoln Ave., Detroit, Mich.*

MES W. CLIFT, (Mechanical). D'ftsman, F. & P. M. R. R., Saginaw, '99-'00. Do. Wickes Bros., Saginaw, '00. Do. Industrial Wks., Bay City, '00-'01. Do. Am. Loco. Wks., Dunkirk, N. Y., '01-'02. Asst. Examiner Patent Office, Washington, D. C., '02 to date. *1434 Chapin St., Washington, D. C.*

. WARREN CONABLE, (Civil). M. Nat'l Geographical Ass'n. City Collector, Barnhart Bros. & Spindler, Typefounders, '99-'02. Asst. Creditman do., '02-4. Office Mngr. do., '04 to date. Director do., '04-'05. Director, St. Louis Printers Supply Co., Great Western Type Fdy., Omaha, and the Barnhart Type Fdy. Co., Dallas, '05 to date. *185 Monroe St., Chicago, Ill.*

ILLIAM L. COOPER, (Mechanical). M. Iron & Steel Inst., Great Britain. D'ftsman, Stirling Boiler Co., Barberton, O., '99. Do. Riter-Conley Co., Pittsburg, '00. Mech. Engr. Field & Hinchman, Detroit, '00-'01. Designer, Lackawanna Steel Co., Scranton, '01-2. Asst. Mech. Engr., Robt. W. Hunt & Co., Chicago, '02-3. European Mngr. do., London, '03 to date.
Norfolk House, Cannon St., London, E. C., England.

ALTER T. CURTIS, (Civil). Active Member Western Soc. of Engrs. D'ftsman Wisconsin Bdge. & Iron Co., '99. Asst. Engr. C. & N. W. Ry. (Bdge. Dept.), '00. Checker Am. Bdge. Co., Pittsburg, '00. Chf. D'ftsman C. & N. W. Ry. (Bdge. Dept.), '01-3. Mngr. of Construction, Jos. T. Ryerson & Son, Chicago, '03. Chf. D'ftsman Wisconsin Bdge. & Iron Co., '04 to date.
North Milwaukee, Wis.

URT J. DENMAN, (Electrical). M. Toledo Soc. of Engrs. Chf. Electrician Toledo & Maumee Valley Ry., '95-9. Instr. Toledo Univ., '99-'00. Consulting Elect. and Mech. Engr., Clark & Denman, '00-'02. Elect. Engr., Toledo, Bowling Green & Southern Traction Co., '02-4. Elect. Engr. with Edison Illuminating Co., '04 to date. *1291 Fourteenth Ave., Detroit, Mich.*

ARTLETT C. DICKINSON, (Civil). Timekeeper, Geo. A. Fuller Co., '99-'00. Material Clerk, Thompson-Starret Co., '00-'01. Supt. do., 01-3. Gen'l Supt. do., '03-4. Vice-Pres't and Treas., Bottsford, Dickinson Co., '04-'05. Mngr. Thompson-Starrett Co., '05 to date. *Commercial Nat'l Bank Bldg., Washington, D. C.*

OHN H. DRESSEL, (Electrical). Assoc. Member Am. Inst. E. E. Checker on Drawings, Gen'l Elect. Co., '99-'01. Engr., Wagner E. & M. Co., '01-2. Engr., Westinghouse E. & M. Co., '02-4. Partner, Maphet & Dressel, '04 to date.
605 Commercial Tribune Bldg., Cincinnati, O.

George H. Gibson, (Electrical). M. Am. Inst. of E. E. M. Am. Soc. Mech. Engrs. Apprentice, Westinghouse Elec. & Mfg. Co., '99. Asst. Editor *Engineering News,* '99-'01. Editor Westinghouse Co.'s Pub. Dept., '01-3. Mngr. Dept. of Publicity, Internat'l Steam Pump Co., '03-'05. Propr., Geo. H. Gibson Co., Advertising Engrs., '05 to date.
628 West 148th St., New York, N. Y.

Harmon A. Harris, (Electrical). Engr. Ill. Telephone Construction Co., '99-'01. Mngr. Purchasing Dept., Automatic Electric Co., '01-2. Asst. Gen'l Mngr. Automatic Elect. Co., '02 to date. 2nd Vice Prest. do., '05 to date.
4915 Woodlawn Ave., Chicago, Ill.

Sanford F. Harris, (Electrical). Private Sec'y to the Pres't, Ill. Tunnel Co., '99-'05. Mngr. Chicago Office, J. B. Russell & Co. (Bankers, N. Y.), '05 to date.
311 Rookery Bldg., Chicago, Ill.

Milton C. Hartman, (Electrical). Machine Dept. Siemens & Halske Elect. Co. Dynamo Testing, Western Elect. Co., Eng'g Dept., Edison Co. Assoc. Partner, Chas. W. Carman & Co., Consulting Engrs., '02-6. *3422 Calumet Ave., Chicago, Ill.*

*Orra E. Heffelbower, (Civil). U. S. Engr. Office. Died June 29, 1903.

Clinton J. Hixson, (Electrical). Assoc. Mem. Inst. E. E. D'ftsman. Checker, Testing Dept., Asst. Engr., Genl. Elect. Co., '99-'01. Engr. Ry. Dept., Allgemeine Elektricitate Gesellschaft, Berlin, '01-4. Engr. in charge of Control Div., British Westinghouse Elec. & Mfg. Co., Manchester, '04-6.
British Westinghouse Elec. & Mfg. Co., Trafford Park,
Manchester, England.

Frederick R. Hoover, (Civil). D'ftsman and Estimator, Wrought Iron Bridge Co., Kansas City Office, '99-'00. Contracting Engr. American Bridge Co., Kansas City Office, '00-'02. Contracting Engr. and Erection Mngr. The Canton Bridge Co., Kansas City Office, '02-6. *514 N. Y. Life Bldg., Kansas City, Mo.*

James L. Horth, (Mechanical). Foundry Clerk, U. S. Heater Co., '99-'00. D'ftsman Am. Bdge. Co., Detroit Plant, '00-'06.
1217 Lafayette Ave., Detroit, Mich.

Lewis G. Howlett, (Electrical). B.S., M.E., '01. M. Am. Soc. Mech. Engrs. Asst. Chf. D'ftsman, Industrial Wks., '99-'01. Asst. Supt. do., '01-5. Supt. do., '05 to date.
221 N. Van Buren St., Bay City, Mich.

Edwin A. Hughes, (Electrical). Telep. Dept. Western Elect. Co.
Elkhart, Ind.

William L. Kimmel, (Electrical). Elect. Engr., Grangeville Elect. Light & Power Co., '99-'02. Do. Wise Boy Min. & Mill. Co., '02-3. Elect. Engr. and Contractor, Nixon & Kimmel, '03 to date. *327 Mill St., Spokane, Wash.*

harles A. La Fever, (Electrical). M. Am. Inst. E. E. M. Elect. Congress of the World at St. Louis, '04. Asst. Supt. and Elect. Engr. Advance Thresher Co., '99 to date. Board of Public Wks., City of Battle Creek, '00-'07.
75 Garrison Ave., Battle Creek, Mich.

rnest Lunn, (Electrical). With Detroit Edison Co., '99-'02. Supt. of Storage Batteries, Chicago Edison Co., '02 to date.
139 Adams St., Chicago, Ill.

illiam M. McKee, (Electrical). Testing Dept. Western Electric Co., '99. Construction Work, U. S. Com'n to Paris Exposition, '99-'00. Construction Work, Mather & Platt, Ltd., Manchester, England, '01. Elect. Mining Engr. Pittsburg Coal Co., '04. Elect. Mining Engr. Jeffrey Mfg. Co., Columbus, O. Commercial Engr. do., '05, to present date.
709 Farmers Bank Bldg., Pittsburg, Pa.

Augustus J. Mayworm, (Mechanical). Asst. Engr. Fletcher Paper Co. Do. Alpena Portland Cement Co. Died at Alpena, Mich., in July, '01.

illiam L. Miggett, (Mechanical). M.E., '04. M. Am. Soc. M. E. M. Am. Soc. for Promotion of Eng'g Education. Supt. Eng'g Shops, U. of M., for six years.
432 Hamilton Place, Ann Arbor, Mich.

ohn T. Mountain, (Electrical). Assoc. A. I. E. E. Operating Engr. Chicago Edison Co., '99-'06.
409 E. Huron St., Chicago, Ill.

larence W. Noble, (Civil). C.E., '02. Assoc. Mem. Am. Soc. C. E. Aide U. S. Coast and Geod. Survey, '99-'00. D'ftsman, McClintic Marshall Const. Co., '00. D'ftsman and Checker Wisconsin Bridge Co., '00-'01. Checker and Squad Foreman, Ill. Steel Co., '01-'03. Estimater American Bridge Co., Kansas City, '03-4. Engr., Rudolph Markgraf, Arch't, '04-5. Engr., Reinforced Concrete Dept., Builders' Material Supply Co., '05 to date.
2005 E. 7th St., Kansas City, Mo.

rd E. Richardson, (Electrical, Mechanical, '00). Elect. and Steam Testing, Field & Hinchman, '00. Elect., Detroit United Ry. Co., '00. Do. Saginaw Valley Traction Co., '01. Gen'l Engr. do., '02-3. Engr., Willcox Eng. Co., '06.
402 N. Jefferson Ave., Saginaw, Mich.

ellington Roberts, (Civil). With Isthmian Canal Com'n. Asst. Engr., Algomah Cent. R. R.
Sault Ste. Marie, Mich.

avid N. Rosen, (Mechanical). Shop and Erecting and Draughting, E. P. Ellis Co., Milwaukee, '99-'02. Supt. Construction of Power Plants, Sargent & Lundy, Chicago, '02-5. In charge of Erection Dept., Stirling Consolidated Boiler Co., '05-6.
C/o Barberton Inn, Barberton, Ohio.

rthur G. St. John, (Civil). D'ftsman, General Electric Co., Schenectady, '99. Locating Engr., E. H. Christ, Grand Rapids, Mich., '99-'00. D'ftsman, Riter-Conley Mfg. Co., Pittsburg, '00. Do. Heyl & Patterson, Pittsburg, '00-'01. Do. Wisconsin Bdge.

& Iron Co., N. Milwaukee, Wis., '01. Estimator, Grace & Hyde, Chicago, '01-2. Estimator and Chf. D'ftsman, Warren R. Roberts, Chicago, '02-4. Member of firm, The St. John Eng. Co., Chicago, '04 to date.
1749 Railway Exchange Bldg., Chicago, Ill.

Cary D. Terrell, (Electrical). Junior Am. Soc. Mech. Engrs. M. Western Ry. Club. Pittsburg Ry. Club. Special Apprentice, Ill. Central R. R., Chicago, '99-'01. Assoc. Editor *Ry. and Engineering Review*, Chicago, '01-4. Asst. to President, Kentwood & Eastern R. R., Chicago, '02-3. Asst. Road Foreman of Engines, A. T. & S. F. Ry., Lines west of Albuquerque, Los Angeles, Cal., '04-5. Sales Agt., Pressed Steel Car Co., Pittsburg, '05 to date. *1914 Farmers' Bank Bldg., Pittsburg, Pa.*

Frank Trott, (Mechanical). Testing Engines, Fairbanks, Morse & Co., '99. Statistician, Chicago Edison Co., '99-'00. D'fting, Estimator and Salesman, Whiting Foundry Equip. Co., '00-'05. Asst. Engr. of Construction, Amer. Steel Foundries, '05.
2413 3rd St., Chester, Pa.

Charles H. Weideman, (Mechanical). D'ftsman, S. V. Huber & Co. Do. Amer. Steel Hoop Co. Do. Sharon Steel Co.
Sharon, Pa.

William R. Weidman, (Mechanical). D'ftsman, Amer. Bdge. Wks. Do. Scherzer Rolling Lift Bdge. Co. *Chicago, Ill.*

Clarence W. Whitney, (Mechanical). Assoc. Editor *Western Electrician*, Chicago, '99-'03. Pacific Coast Representative, McGraw Publishing Co. (headquarters in San Francisco), '03-4. Mngr. Publicity Dept., Abner Doble Co., San Francisco, '04 to date. *2630 Haste St., Berkeley, Cal.*

Bertram D. Wilber, (Electrical). Testing, West. Elect. Co., '99. Asst. Div. Inspector, Cent'l Union Telep. Co., '00. *Peoria, Ill.*

*Arthur B. Wood, (Electrical). D'ftsman, Asst. Elect. Engr., Eddy Motor Co. Died in Albany, N. Y., in April, '01.

1900.

Mark B. Beattie, (Electrical). Asst. Appraiser Elect. Dept., Mich. State Tax Com. Production Dept., Western Electric Co. Sales Dept., General Electric Co. D'ftsman on Construction Work, Mich. Asylum, Asst. to Prof. M. E. Cooley. Salesman, Crocker-Wheeler Co.
C/o Crocker-Wheeler Co., Old Colony Bldg., Chicago, Ill.

Elias H. Beckstrand, (Electrical). M. M. E. (Cornell), '01. Assoc. Mem. Am. Inst. E. E. M. Sigma Xi Soc. Prof. of Mech. Eng'g, Univ of Utah, '01-5. *Salt Lake City, Utah.*

Claude K. Bentley, (Mechanical). D'ftsman, Northern Eng. Wks., '00. Do. Whiting F'dry. Equip. Co., '00-'02. Estimator do., '02-5. Eng. Dept. do., '05 to date.
15440 Turlington St., Harvey, Ill.

rederic A. Bergbom, (Mechanical). D'ftsman, Gates Iron Works, '00-'01. Do. Pearson Machine Co., '01. Do. Am. Bdge. Co., '01-2. Asst. Engr. C. & N. W. Ry., Ch. Engrs. Office, '02-5. Asst. Genl. Inspector of Bridges, Chicago & Northwestern Ry., '05 to date. *1799 Humboldt Boulevard, Chicago, Ill.*

rederick N. Bradley, (Civil). With Bridge Dept. C. & N. W. Ry., '00-'01. With Ill. Steel Co., '01-2. Asst. Engr., Bridge Dept., C. & N. W. Ry., '02-3. Asst. Chf. D'ftsman, Ill. Steel Co., '03-4. With Ralph Modjeski, Consulting Engr., '04-5. With Hoover & Mason, Contracting Engrs., '05 to date.
1256 Perry St., Chicago, Ill.

seph W. Busch, (Electrical). *Marquette, Mich.*

aul Cheever, (Mechanical). Assoc. Member Am. Inst. E. E. With Field & Hinchman, 00-'03. D'ftsman, Chicago Edison Co., '03. Asst. to Elect. Engr., Ontario Power Co., '03 to date.
Niagara Falls, South, Ontario.

arlos C. Cleverdon, (Mechanical). Chief D'ftsman, Pearson Mach. Co., '00-'02. Salesman, Manning, Maxwell & Moore, '02-3. Designer, Shaw Elect. Crane Co., '03-4. Asst. Gen'l Foreman, Goss Print. Press Co., '04-6. Asst. Supt., Sheffield Car Co., '06 to date. *Main St., Three Rivers, Mich.*

enardo Davila, (Civil). Mex. Technical & Financial Co.
Monterey, Mex.

arry H. Dickinson, (Electrical). With J. A. Erner & Co., June, '00 to July, '01. Constructing Engr., The Arnold Co., July, '01 to date.
C/o The Arnold Company, 181 LaSalle St., Chicago, Ill.

aul A. Dratz, (Mechanical). City Elect'n, Escanaba. With Field & Hinchman, Detroit. With J. A. Erner & Co. Inspector, Salesman and Estimator, Whiting Foundry Equip. Co., '01 to date. *Harvey, Ill.*

avid G. Fisher, (Civil). M. Western Gas Assoc. M. Am. Gas Light Assoc. D'ftsman, Toledo Bridge Co., and American Bridge Co., '00-'02. Supt. Briggs Real Estate Co., '02-3. Supt., Station "B," Laclede Gas Light Co., '03 to date.
C/o Laclede Gas Light Co., St. Louis, Mo.

ndrew Grabenstein, (Civil). *Lake Linden, Mich.*

arry D. Harting, (Civil). Jr. Engr., U. S. Gov't, '00-'04. Hydro-Graphic Surveyor, Navy Dept., U. S., '04 to date.
Guantanamo Naval Station, Cuba.

rnest H. Jacobs, (Electrical). Engr. Switchboards and Switchboard Apparatus, Gen. Elect. Co., '00 to date.
33 Parkwood Blvd., Schenectady, N. Y.

ee F. Johnston, B.S. (Purdue) (Civil). U. S. Engr. Office. Died Nov. 10, 1902.

Oscar G. Joseph, (Civil). Designer, Mount Vernon Bdge. Wks., '00-'01. D'ftsman, Am. Bdge. Co., Toledo, '01-3. Asst. Engr. L. & N. R. R. Co., '03-'06. Chief Engr., McDonald & Dod. Arch'ts, '06 to date.
101 E. St. Catherine St., Louisville, Ky.

Alfred H. Knight, (Mechanical). M. M. E. (Cornell), '01. D'ftsman, Eastern Shipbuilding Co., '01-2. Do. New York Shipbuilding Co., '02-3. Asst. Chf. D'ftsman, Hull Dept., Great Lakes Eng. Works, '03-5. *314 Vinewood Ave., Detroit, Mich.*

Otto A. Krause, (Mechanical). Supt., Hirth, Krause & Co., Shoe Mfgrs. do., Range River Elect. Light & Power Co.
Rockford, Mich.

Robert E. Kremers, A.B. (Hope College) (Civil). D'ftsman, City Engr. Office. *Salt Lake City, Utah.*

William Lehnartz, (Mechanical). A.M., '01. M. "Verein deutscher Ingenieure." D'ftsman, Allis Chalmers Co., '01-3. Do. Bucyrus Co., '04. Asst. to Supt. do., '04-'05. D'ftsman, Allis Chalmers Co., '05 to date.
173 S. Union St., Grand Rapids, Mich.

Ora M. Leland, (Civil). Assoc. Member Am. Soc. C. E. Member Am. Assoc. for the Advancement of Science. Member Societé Belge d' Astronomie. M. Nat'l Geographic Soc. Chf. Clerk and D'ftsman, Office of U. S. Surveyor General of Florida, '98-9. Clerk (Division of Surveys), U. S. General Land Office, '00. Aid, U. S. Coast and Geodetic Survey, '00-2. Computer, do., '02-3. Clerk (Division of Surveys), U. S. General Land Office. '03. Instr. in Civil Eng., Cornell Univ., '03 to date. Surveyor to the U. S. Commissioner for the Demarkation of the Boundary between Alaska and Canada, '04 to date.
127 Cascadilla Place, Ithaca, N. Y.

Alfred E. Lindau, (Mechanical). M. Western Soc. of Engrs. Assoc. M. Am. Soc. C. E. Mem. W. S. Engrs. With Mich. Tax Commission, '00-'01. D'ftsman, Whiting F'dry Equip. Co., '01. Do. Wisconsin Bdge. & Iron Co., '01. Do. Bdge. Dept. C. B. & Q. Ry., '01-3. Asst. Engr., Bdge. Dept. C. R. I. & P. Ry., '03-5. Asst. Engr., St. Louis Expanded Metal Fire-proofing Co., '05. Company Engr., Expanded Metal & Corrugated Bar Co., '06 to date. *925 36 Frisco Bldg., St. Louis, Mo.*

Chester B. Loomis, (Mechanical). With Western Elect Co. D'ftsman, Brooks Locomotive Wks. *Dunkirk, N. Y.*

Frederick H. Loud, (Civil). D'ftsman, Houghton County St. Ry., '00-'01. Asst. Engr., Atlantic Mining Co., on Redridge Dam., '01-2. Do. Phoenix Mining Co., '02-3. City Engr., Hancock. Mich., '03-4. Const. Engr., Rogers Construction Co., Civil Engr. for H. M. Loud's Sons Co., and A. S. & N. W. R. R. (Water Power Surveys), '04-5. Secy. and Sales Mngr., Buffalo Maple Flooring Co., '05 to date. *401 Delaware Ave., Buffalo, N. Y.*

Guy W. Lunn. Engr., Mich. Telephone Co., '00-2. Engr., Chicago Edison Co., '02 to date. *139 Adams St., Chicago. Ill.*

ROYAL J. MANSFIELD, (Civil). C.E., '02. Jun. Am. Soc. C. E. Aid, U. S. Coast Survey, '98-9. D'ftsman, Cambria Steel Co., '00-'01. Do. Riter-Conley Mfg. Co., '01-2. Asst. Engr. do., '02-4. Asst. Engr., chg. buildings, Wellman Seaver Morgan Co., '04 to date. *C/o Wellman Seaver Morgan Co., Cleveland, O.*

HARRY S. MARSH, (Electrical). Asst. Elect. Engr., Pittsburg Plate Glass Co. *Fort City, Pa.*

SHIGERU MATSUYAMA, (Mechanical). With Cornell Machine Co., Chicago. *Tokio, Japan.*

WALTER B. MAURICE, (Civil). M. Detroit Eng. Soc. Insp., Mich. State Tax Com'n, '00-'01. D'ftsman, Am. Bridge Co., '01-3. Do. Detroit Water Board (Civil Eng. Dept.), '03 to date. *1285 Jefferson Ave., Detroit, Mich.*

HENRY A. MCLEAN, (Mechanical). *Mayfair, Ont.*

EZRA B. MEAD, (Mechanical). Ed. Dept. *Construction News. Chicago, Ill.*

WILLIAM C. MILLER, (Electrical). With Edison Ill'g Co. *Detroit, Mich.*

FREDERICK N. NELLES, (Civil). D'ftsman, Cambria Steel Co. *Johnstown, Pa.*

ARTHUR W. NORTON, (Mechanical). With Norton Bros., '00-'05. Vice Prest. Continental Can Co., '05 to date. *4 Wabash Ave., Chicago, Ill.*

FLOYD J. PAGE, (Mechanical). D'ftsman, Brown Hoist. Mach. Co., '00-'01. Do. Northern Eng. Wks., '01. D'ftsman and Checker, Whiting F'dry Equip. Co., '01-'05. D'ftsman, Link Belt Mach. Co., '05-'06. Estimating Engr., Whiting Fdy. Equip. Co., '06 to date. *15607 Lexington Ave., Harvey, Ill.*

CLARENCE J. RANNELLS, (Civil). With Cambria Steel Co. *Johnstown, Pa.*

ANTON S. ROSING, (Civil). M. Western Soc. of Engrs. Rodman, Chicago & Northwestern Ry., '00-'02. Instrumentman do., '02-5. Resident Engr., Chicago Southern Ry., '05 to date. *Crete, Ill.*

RICHARD W. RUNGE, (Mechanical). B.S., E.E., '02. Testing Gasoline Engines, Fairbanks, Morse & Co., Beloit, Wis., 10 months. D'ftsman do., 8 months. D'ftsman and Checker, The Shaw Electric Crane Co., Muskegon, Mich., 1 year. D'ftsman and Insp., C. & N. W. Ry. Co., Chicago, Ill., 14 months. D'ftsman, Bucyrus Co., S. Milwaukee, Wis., 10 months. D'ftsman, Wisconsin Bridge & Iron Co., May, '05 to date. *North Milwaukee, Wis.*

HARRY M. SEDGWICK, (Mechanical). Sec'y and Treas., S. Wilks Mfg. Co., '00 to date. *5018 Washington Ave., Chicago, Ill.*

ALVA F. TRAVER, (Mechanical). M. Mich. Gas Ass'n. M. Ohio Gas Ass'n. M. Western Gas Ass'n. D'ftsman, Grand Rapids Gas Light Co., '02. Asst. Supt. do., '02-3. Supt. do., '03 to date. *273 Lagrave St., Grand Rapids, Mich.*

JOSEPH J. WALSER, (Civil). Purchasing Agt. and Asst. Supt., The Goss Printing Press Co., Chicago, '00 to date.
417 S. Central Ave., Austin, Chicago, Ill.

CHARLES M. WATERS, (Civil). Insp., U. S., Ill. & Miss. Canal, '00-'02. Topographer, U. S., Ill. River Survey, '02-3. In charge of section of Ill. & Miss. Canal, '03-6. *Geneseo, Ill.*

FREDERICK J. WILBUR, (Civil). Rodman and Inspector, N. Y. C. & H. R. R. R. *Rochester, N. Y.*

JOSEPH W. WOOD, (Electrical). Sec'y and Treas., Niles Steel Tank Co., formerly Freeland Mfg. Co. *Main St., Niles, Mich.*

GEORGE D. WUERFEL, (Mechanical). M. Toledo Soc. of Engrs. Mech. Engr., Toledo F'dry & Mach. Co., '00 to date.
226 Floyd St., Toledo, O.

†JACOB G. YOUNG, (Civil). M. Western Soc. of Engrs. Chf. D'ftsman, Chicago Bridge & Iron Wks., '95-'00.

1901.

LESLIE D. ANDERSON, (Mechanical). M. Lake Superior Min. Inst. Erecting Machinist and D'ftsman, Nordberg Mfg. Co., Milwaukee, '01-2. D'ftsman, Bucyrus Co., Milwaukee, '02-3. Mech. Engr., Champion Copper Co., Painesdale, Mich., '03-4. Checker. Bucyrus Co., Milwaukee, '04-5. Chief Engr., Arizona Smelting Co., Prescott, Ariz., '05 to date.
Val Verde, Yarapai Co., Ariz.

EMILIO ARIZPE, (Mechanical). Active Member of U. of M. Eng. Soc. for four consecutive years. Asst. Engr. to Prof. John R. Allen, in the Mackinac Island Works, '01. Insp. of Constr. at Mich. School of Mines, Charlton & Gilbert, Archts., Houghton, '01-'02. D'ftsman for Field, Hinchman & Smith, Detroit, '02-3. Asst. Engr. in charge of tunnels and canals, Mexican Light & Power Co., Ltd., Necaxa, Pa., Mexico, '03-'04. Left Necaxa in May, 1904. Present address. *Saltillo, Coahuila, Mexico.*

WAREHAM S. BALDWIN, (Chemical). *Grand Rapids, Mich.*

EDWARD L. BENEDICT, (Mechanical). *Cleveland, O.*

HUBERT W. CARPENTER, (Mechanical). *Harvey, Ill.*

WASHINGTON H. CHAPMAN, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Field & Hinchman, Cons. Engrs., '01. Supt. do., '02-3. Chief D'ftsman, Field, Hinchman & Smith, Engrs. and Arch'ts, '03-4. Engr. do., '04 to date.
619 McGraw Ave., Detroit, Mich.

CLARENCE HOWARD CLARK, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Russel Wheel & Foundry Co., '01-2. Erector, Detroi United Ry., '02-3. Chf. D'ftsman, Lloyd Construction Co., '03 to date. *206 Stanley Ave., Detroit, Mich.*

Stephen P. Cobb, (Civil). M. Eng. Soc. of Western Penn. M. Western Gas Ass'n. D'ftsman, Am. Bdge. Co., '01-3. Engr. Elliott & Baton, Pittsburg, '03-4. Asst. in charge of Water Gas Dept., Station A, Laclede Gas Light Co., '04-5. Construction Insp. Gas Dept., Rochester Railway & Light Co., '05 to date.
C/o Rochester Railway & Light Co., Rochester, N. Y.

Charles B. Davis, (Civil). Asst. Chief Engr. D. L. & N. R. R., Summer of '01. Dredge Inspector and Transitman, U. S. Eng. Corps, '01-2. Asst. Engr., M. C. R. R., Summer '02. Instr., U. of M., '02. Supt. Mines, Allegheny Ore & Iron Co., '03. Transitman, Div. & Min. Engr., T. C. I. & R. R. Co., '04-6.
Johns, Jefferson Co., Ala.

Gustav B. Eggert, (Mechanical). *823 Willson Ave., Cleveland, O.*

Lewis M. Gram, (Civil). *Toledo, O.*

Guy P. Henry, (Mechanical). D'ftsman, Brown Hoist. Co., Cleveland, '01. Do. Russel Wheel & Foundry Co., Detroit, '01-'02. Do. Am. Bridge Co., Detroit, '02-3. Do. Garry Iron & Steel Co., Cleveland, '03. Establishing a cost system and general Mechanical Engineering, Chi. Portland Cement Co., LaSalle, Ill., '03-4. D'ftsman, Am. Bridge Co., Detroit, '04 to date.
522 Trumbull Ave., Detroit, Mich.

George S. Hill, (Civil). M. Western Soc. of Engrs. D'ftsman, Am. Bdge. Co., Toledo, '01-3. Designer, Scherzer Rolling Lift Bdge. Co., '03-4. Checker, Wisconsin Bdge. & Iron Co., '04. Asst. Engr., Scherzer Rolling Lift Bdge. Co., '04 to date.
3038 Groveland Ave., Chicago, Ill.

Alpheus E. Holcomb, (Mechanical). Member Am. Soc. of M. E.; full Member of Am. Foundrymen's Ass'n. D'ftsman, Industrial Wks., Bay City, '01-2. Asst. Chf. D'ftsman do., '02-5. Asst. Chf. Engr. do., '05. Designing Engr., Bucyrus Co., South Milwaukee, May to Oct., '05. Asst. Sales Agt., Featherstone Fdy. & Mach. Co., Chicago, Oct., '05, to March, '06. Designing Engr., F. C. Austin Drainage Excavator Co., Chicago, March, '06 to date. *2204 W. Van Buren St., Chicago, Ill.*

William C. Hornberger, (Mechanical). *Detroit, Mich.*

Raymond Fuller Horton, (Civil).
753 Campbell Ave., Detroit, Mich.

George D. Hudnutt, (Mechanical). D'ftsman, Studebaker Bros. Mfg. Co., S. Bend, Ind., '01-2. Do. Otis Elevator Co., Yonkers, N. Y., '02-4. Asst. Chf. D'ftsman, Otis Elevator Co., Chicago, '04 to date. *1055 Sheridan Road, Chicago, Ill.*

Edgar W. Kiefer, (Mechanical). D'ftsman, Detroit Shipbuilding Co., '01-3. Chief Engr., Mich. Sulphite Fibre Co., '03-6.
928 Seventh St., Port Huron, Mich.

William W. Kittleman, (Electrical). Test Dept., Western Elect. Co., Chicago, '02. Asst. Mngr., Elect. Equip. Co., Chicago,

'02-3. Assoc. Editor, *Western Electrician,* June to Dec., '02. Asst. Engr., Gen'l Power Imp. Co., Dec. '03 to Jan. '05. Selling Engr., Gen'l Elect. Co., Jan. '05 to date.
616 Fourteenth Ave., Detroit, Mich.

Frederick E. Leefe, (Civil). *Sault Ste. Marie, Mich.*

Charles G. Leeson, (Mechanical). Erecting Engr., Underfeed Stoker Co. of America, June, '01, to April, '03. D'ftsman, Bucyrus Co., S. Milwaukee, April, '03, to Jan., '04. Head of Production Dept. do., Jan., '04 to date. *South Milwaukee, Wis.*

Bernard H. Liskow, (Mechanical).
291 Greenbush St., Milwaukee, Wis.

Thomas L. B. Lyster, (Electrical). M. M. E. (Cornell), 03. Assoc. Am. Inst. of E. E. Asst. Insp. of Dredging, U. S. Gov't, '01. Testing Dept., General Electric Co., '01-2. Graduate Student, Cornell Univ., '02-3. Construction Dept., Fort Wayne Electric Wks., '03. Asst. Engr., Westinghouse, Church, Kerr & Co., '03 to date.
C/o Westinghouse, Church, Kerr & Co., 10 Bridge St.,
New York, N. Y.

Andrew H. McDougall, (Mechanical). D'ftsman, Studebaker Bros. Mfg. Co., South Bend, Ind., '01-3. Do. Whiting Foundry Equip. Co., Harvey, Ill., '03-4. Estimator do., '04-'05. Chief D'ftsman do., July, '05 to date. *15420 Lexington Ave., Harvey, Ill.*

Walter MacGregor, (Mechanical). M.E., '03. Foreman Mach. Shop, Detroit Plant, American Radiator Co., '01. D'ftsman, Whiting Foundry Equip. Co., Harvey, Ill., '02-3. D'ftsman, American Steel Foundries, '03-4. Constr. Engr. do., '04-5.
C/o American Steel Foundries, Pittsburg, Pa.

George D. McNaughton, (Civil). Insp., Ralph Modjeski, Cons. Engr., '01-4. Do. Hildreth & Co., Cons. Engr., '04. Do. Pittsburgh Testing Laboratory, '04. Estimating Engr., Levering & Garriques Co., '05. *350 West 22nd St., New York, N. Y.*

Ralph M. Myers, (Mechanical). Asst. Professor of Mathematics and Eng. in Univ. of S. Dakota. *Muir, Mich.*

Alfred L. Newton, (Civil). C.E., '04. Sec'y and Treas. Newton Engineering Co., '02 to date. *424 Jackson St., Milwaukee, Wis.*

John C. Parker, (Mechanical). A.M., '02. E.E., '04. Assoc. Member Am. Inst. of E. E. Junior, Am. Soc. of C. E. Assoc. Mem. Am. Soc. M. E. Electrical Tester, General Electric Co., '02-3. Instr. in E. E. and M. E., Union Univ., '03-4. Asst. Engr. in charge Ontario Power Co., '04-'05. Asst. to Chief Engr., Iroquois Construction Co., '05 to date.
514 Fidelity Bldg., Buffalo, N. Y.

Arthur H. Richardson, (Mechanical). With the Western Electric Co., '01-3. Asst. Employment Agent do., '03-4. Estimator of Manufacturing Costs do., '05-6.
341 Wisconsin Ave., Oak Park, Ill.

EUGENE A. RUMMLER, (Mechanical). M. Western Soc. of Engrs., M. Patent Law Ass'n. D'ftsman, Detroit Dry Dock Co., '98-9. D'ftsman in charge of construction, Crescent Ship Yds., Elizabeth, N. J., '99-'01. Mechanical Expert and Solicitor of Patents, Member of firm, Rummler & Rummler, Patent Attorneys, Chicago, '01 to date. *1400-143 Dearborn St., Chicago, Ill.*

LOUIS E. SEAS, (Civil). D'ftsman, Cambria Steel Co., '01. Do. Thompson-Starrett Co., '01-2. Estimator, U. S. Realty & Construction Co., '03. Engr. and Estimator, Levering & Garrigues Co., '04-5. *350 W. 22nd St., New York, N. Y.*

LEONARD SHAW, (Mechanical). *179 Koch Ave., Detroit, Mich.*

HARRY J. SPROAT, (Mechanical). M.S., '02. D'ftsman, U. S. Lake Survey, '02. Do. Detroit Shipbuilding Co., '02-4. Eng. Dept. American Radiator Co., '05 to date. *1321 St. Antoine St., Detroit, Mich.*

ERNST STECK, (Electrical). Testing and Erecting, Western Elect. Co., '01-2. Asst. C. F. Drake, Mech. Engr., '02-3. In charge of Estimating Dept., Ft. Wayne Elect. Works, '03-5. Instr. in E. E., U. of M., '05-6. Elect. Engr. with Dodge & Day, Modernizing Engrs., '06 to date. *C/o Dodge & Day, Nicetown, Philadelphia, Pa.*

WILLIAM W. TALMAN, (Mechanical). Asst. to Supt., Poland Mining Co., Feb. '01 to June '02. Sales Agt., St. Louis Car Wheel Co., July, '02 to date. *511 Bank of Commerce Bldg., St. Louis, Mo.*

JAMES M. WETMORE, (Electrical). *541 Jefferson Ave., Detroit, Mich.*

BERT S. YORK, (Electrical). M. Internat'l Electrical Congress, St. Louis, '04. Chaser (Tel. Dept.), Western Elect. Co., also Dynamo Tester, '01-2. Construction work on high tension switchboards, Chicago Edison Co., '02-3. Engr., Cutler Hammer Mfg. Co., '03-5. Employed as Patent Expert on Power and Switchboard Apparatus, Western Elect. Co., Chicago, since May, '05. *1352 Lawrence Ave., Chicago, Ill.*

CLAUDE E. YOUNG, (Civil). Checker and Squad Boss, Cambria Steel Co., '01-5. *117 South St., Johnstown, Pa.*

THEODORE F. H. ZEALAND, (Mechanical). M. Detroit Eng. Soc.; M. Westinghouse Electric Club; M. Western Railway Club. D'ftsman, Motive Power Dept., Mich Central Ry., '01-4. Do. Union Switch & Signal Co., Swissvale, Pa., '04 to date. *430 Maple Ave., Edgewood Park, Allegheny Co., Pa.*

1902.

AIKMAN ARMSTRONG, (Mechanical). Secy. and Treas. Armstrong Woolen Co., '05 to date. *307 John R. St., Detroit, Mich.*

ARTHUR M. BARRETT, (Civil). Vice-Pres't Barret Bindery Co., '02 to date. *3230 Calumet Ave., Chicago, Ill*

Arthur H. Bennett, (Civil). D'ftsman, Russel Wheel & Foundry Co., '02. D'ftsman and Instrumentman, Pennsylvania Tunnels, New York City, '02-'05. Designer, Detroit River Tunnel, '05-6.
149 Avery Ave., Detroit, Mich.

Homer Britton, (Mechanical).

Chason W. Brooks, (Civil). M. Western Soc. of Engrs. Junior Mem. Am. Ry. Eng. and Maintenance of Way Ass'n. Instrumentman, Chicago & Northfestern Ry., '02. Asst. Engr., Toledo, St. Louis & New Orleans Ry., '02-3. D'ftsman, Amer. Bdge. Co., '03-4. Asst. Contracting Engr., Wisconsin Bdge. & Iron Co., '04 to date. *6951 Perry Ave., Chicago, Ill.*

William N. Chaffee, (Electrical). Apprentice, Westinghouse Elect. & Mfg. Co., '02-3. Elect. Engr. do., '03-6.
260 Shady Ave., Pittsburg, Pa.

Charles V. Conover, (Mechanical).

Ward A. Detwiler, (Mechanical).

John L. Dickey, (Civil). U. S. Insp., Imp. Grand River, La., '02-3. Do. Plaquemine Locks, '03-4. U. S. Junior Engr., Southwest Pass Jetties, '04 to date.
Room N, Custom House, New Orleans, La.

Adolphus. M. Dudley, (Electrical). Member Testing Dept., Gen'l Elec. Co., '02-4. Engr., Westinghouse Elec. & Mfg. Co., '04 to date. *429 Kelley Ave., Wilkinsburg, Pa.*

Robert M. Hall, (Mechanical).

William S. Hazelton, (Mechanical). A.B., '01. Asst. Testing Mech. Engr., Ann Arbor R. R., '02. Instr. Machine Design, Armour Inst. Technology, '02-3. Instr. Mech. Eng., Univ. N. Dakota, '03-4. D'ftsman, Northern Eng. Wks., Summer '04. Asst. Prof. M. E., U. of M., '04-6. D'ftsman, Woodberg Mfg. Co., Milwaukee, Summer '05.
824 E. University Ave., Ann Arbor, Mich.

Fred M. Hopkins, (Mechanical). D'ftsman, Field, Hinchman & Smith, '03. Asst. Examiner in U. S. Patent Office, '04 to date.
U. S. Patent Office, Washington, D. C.

Henry Imhof, (Mechanical).

Ray P. Jackson, (Electrical). Elect. and Mech. Engr., Westinghouse Elect. & Mfg. Co., '02 to date.
735 Wallace Ave., Wilkinsburg, Pa.

Roscoe B. Jackson, (Mechanical). Junior Mem. Am. Soc. M. E. Asst. to Dean, Eng. Dept., U. of M., '01-3. Supt. of Const'n, Eng. Bldg., U. of M., '02-4. Instr. in Mech. Eng., U. of M., '03-4. Tsst. to Gen'l Supt., Olds Motor Wks., Detroit, '04. Asst. to Gen'l Mangr., Olds Motor Wks., Detroit, '04 to date.
310 Cadillac Ave., Detroit, Mich.

Harry F. Johnson, (Civil). M. Detroit Eng. Soc. Junior Engr., U. S. Lake Survey, '03 to date. *33 Campau Bldg., Detroit, Mich.*

EDMUND P. KINNE, (Mechanical). Mech. Engr., Am. Steel Foundries, Chicago, '02-5. M. E. Coupler Dept., Am. Steel Foundries, Alliance, '05 to date. *120 Arch St., Alliance, O.*

FOREST H. LANCASHIRE, (Mechanical).

JOHN E. LINABURY, (Mechanical). D'ftsman, Cutler Hammer Mfg. Co., '02. Designing D'ftsman, Bucyrus Co., South Milwaukee, '02-4. Do. Vulcan Iron Wks. Co., '04. Chf. D'ftsman, Ohio Steam Shovel Co., '04. D'ftsman, Am. Bdge. Co., '04 to date. *616 Baker St., Detroit, Mich.*

ROYLANCE R. MCCLOY, (Civil). Civil Engr., Bloomshield & McCloy, Bay City, Mich., '02. D'ftsman, Am. Bdge. Co., Pittsburg, '03-4. Do., Puget Sound Bdge. & Dredging Co., Seattle, '04. Gen'l Mangr. The Northwestern Co., Seattle, '05. D'ftsman, Great Northern Ry., '05. Asst. Engr. do., '06 to date. *1410 Harvard Ave., Seattle, Wash.*

MERRITT C. MCNEIL, (Electrical). M. Detroit Eng. Soc. D'ftsman, F. F. Van Tuyl & Co., '02. Erecting Engr. Wabash Portland Cement Co., '02-3. Chf. D'ftsman, Olds Motor Wks., '03-4. Asst. Mech. Engr. do., '04. Salesman, R. D. Wood & Co., '04 to date. *920 S. 50th St., Philadelphia, Pa.*

PERCY W. MARTIN, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Industrial Wks., '02-3. Do. Russel Wheel & Foundry Co., '03 to date. *285 Lysander St., Detroit, Mich.*

ROBERT H. MERRILL, (Civil). Junior, Am. Soc. C. E. Do. Western Soc. of Engrs. D'ftsman, U. S. Engr. Office, Grand Rapids, '02. Asst. Insp. Harbor Imps., St. Joseph, Mich., Michigan City, Ind., and Grand Haven, Mich., '02-3. Insp. Pier Repair and Extension, Frankfort, Mich., '03. Structural D'ftsman, Hydraulic Dredge at Grand Haven, Mich., '04. Insp. Steel Highway Bdge. Erection, Kent. Co., Mich., '04. U. S. Junior Engr. with field party, U. S. Engr. Office, Grand Rapids, '04. U. S. Junior Engr., Insp. Harbor Imps., Charlevoix and Petoskey, Mich., '04. D'ftsman, City Engr. Office, Grand Rapids, '04-5. U. S. Junior Engr., Petoskey, Mich., '05. Leveler, N. Y. State Barge Canal, Aug., '05, to Mar., '06. Asst. Engr., N. Y. State Residency, No. 3, Eastern Div., Mar., '06 to date. *166 Summer St., Grand Rapids, Mich.*

†ALBERT PRUESSMAN, (Electrical).

RALPH M. ROOSEVELT, (Mechanical). D'ftsman, Matthiessen & Hegeler Zinc Co., La Salle, Ill., '02. Chief D'ftsman, J. W. & Herman Hegeler Zinc Co., Danville, Ill., '03. Supt. of Construction, United Zinc & Chemical Co., Argentine Plant, Kansas City, Mo., '04. Supt. Ore and Roasting Depts. do., '05. Supt. Ore, Roasting and Sulphuric Acid Depts. do., '06. *3724 Baltimore Ave., Kansas City, Mo.*

OTTO S. SCHAIRER, A.B. (Electrical). Engr., Westinghouse Elect. & Mfg. Co., '02-6. *7710 Waverly St., Pittsburg, Pa.*

William D. Shaw, (Electrical). M. Am. Inst. of E. E. Testing Dept. Genl. Elect. Co., '02-6. Eng. Dept. Telluride Power & Transmission Co., '06 to date.
C/o Telluride Power & Transmission Co., Provo, Utah.

David D. Starr, (Mechanical). D'ftsman, Mich. Asylum for Insane, Kalamazoo, Mich., Summer '02. With Am. Bdge. Co., Erecting Dept., Chicago Office, '02-3. With Am. Bdge. Co. (Erection of Boiler House for the Louisiana Purchase Exposition), '03-4. Since February, '04, not engaged in Engineering work.
619 E. 5th, Little Rock, Ark.

†Ernest C. Stroebe, (Marine).

W. C. Swartout, (Civil). Asst. on Engr. Corps, Penn. Co., '02-5. Asst. Engr. Mo. Pacific Ry., '05. Div. Engr. do., '05-6. Right of Way Inspector do., '06 to date.
Room 810, Missouri Pacific Bldg., St. Louis, Mo.

Louis N. Udell, (Mechanical).

Warren M. Vandersluis, (Electrical). M. Railway Signal Ass'n. Do. Ass'n Engrs. Maintenance of Way, Penna. Lines West of Pittsburg. Signal Repairman. Pennsylvania Lines West of Pittsburg, '02-3. Signal Foreman do., '03-4. Signal Inspector do., '04 to date. *1021 Union Station, Pittsburg, Pa.*

Frederick C. Wilson, (Civil). Asst. Civil Engr., in charge of Bdges., Elgin, Joliet & Eastern Ry., '02. Instr. Drawing Dept. U. of M., '02, June, '06. Instr. Civil Eng'g, '06.
912 Forest Ave., Ann Arbor, Mich.

Floyd J. Wood, (Electrical). Engr., Turner Oil Filter Co., '02-4. Supt., Freeland Mfg. Co., '04-5. Do. Niles Steel Tank Co., '06 to date. *Niles, Mich.*

1903.

Harry H. Atwell, (Civil). Recorder, U. S. Lake Survey, '03-4. Junior Engr., U. S. Lake Survey, '04-'05. Instr. Surveying. U. of M., '05-6. *623 S. Division St., Ann Arbor, Mich.*

John G. Barada, (Mechanical). Tester, Gas Engine Dept., Fairbanks, Morse & Co., '03-4. In Power House, Pacific Elect. R. R. Co., '04-5. D'ftsman, Signal Engrs. Office, Union Pacific R. R., '05-6. *2702 Farnam St., Omaha, Nebr.*

Max H. Barber, (Civil). M. Lake Superior Mining Inst. Asst. Mining Engr., Cleveland Cliffs Iron Co., Ishpeming, '03-5. Mining Engr., Cleveland Cliffs Iron Co., Gogebic Range, '05-6.
Ironwood, Mich.

Albert J. Becker, (Mechanical). Asst. Supt. and D'ftsman, Kalamazoo Gas Co., '03-4. Instr. in M. E., Univ. of N. Dakota, '04-'06. Asst. Prof. in M. E., Univ. of N. Dakota, '06 to date.
616 University Ave., Grand Forks, N. D.

Homer W. Benton, (Mechanical).

WILLIS F. BICKEL, (Electrical). Storekeeper, Paymaster, W. H. Crumb Co., Chicago, '03-4. Wire Chief, Independent Tel. Co., Hot Springs, Ark., '04. Chf. Engr. and Supt. Constr., J. D. Bickel, Produce Co., LaCrosse, Wis., McGregor and Mason City, Ia., since July, '04. *McGregor, Ia.*

AUSTIN P. BIGGS, (Mechanical). M.S., '04. Solicitor, Contract Dept., Edison Illuminating Co., Detroit, Mich., '04-6. *537 Elm St., Ann Arbor, Mich.*

MARKHAM CHEEVER, (Mechanical). Assoc. Am. Inst. of E. E. Asst. to Engr. in Charge, The Ontario Power Co., '03-4. Asst. Field Engr. do., '04-05. Asst. Engr., The Telluride Power Co., '05 to date. *Provo, Utah.*

CHARLES P. CHESTER, (Civil). Recorder, U. S. Engr. Office, Louisville, Ky., '03-4. Instrumentman, U. S. Naval Station, New Orleans, La., '05-6. Do. Sanderson & Porter, '06 to date. *600 Elysian Fields Ave., New Orleans, La.*

ARTHUR P. CLARK, (Civil). D'ftsman, Pere Marquette R. R. Bdgs. Engr's Office., Detroit, '03-5. *Dearborn, Mich.*

HARRY L. CLUTE, (Electrical). With Westinghouse Elect. & Mfg. Co., '03-5. With Field, Hinchman & Smith, Detroit, '05 to date. *35 Sibley St., Detroit, Mich.*

JAMES V. DAVIDSON, (Electrical) (Mechanical). D'ftsman, Pitts-Burg & Allegheny Tel. Co., '03. With Engr. Dept. C .D. & P. Tel. Co., Pittszurg, '03-4. Stm. Turbine Test, Westinghouse Mach. Co., '04-5. Mngr. Phila. Office, The Lagonda Mfg. Co., '05 to date. *Builders Exchange, Philadelphia, Pa.*

RICHARD DEYOUNG, (Civil). Assoc. Mem. Eng. Soc. of U. of M. Instrumentman and D'ftsman, Water Power Development, at Cheboygan, Mich., '03-4. D'ftsman, Am. Bdge. Co., Ambridge, Pa., '04-'05. Designer, Scherzer Rolling Lift Bdge. Co., '05 to date. *10226 State St., Chicago, Ill.*

WILLARD J. DOLPH, (Mechanical). D'ftsman, Olds Motor Works, '03-4. Do. Field, Hinchman & Smith, '04. Pattern Clerk, Buhl Malleable Co., '05. D'ftsman, Western Elect. Co. Do. Westinghouse Elect. & Mfg. Co., '06. *800 Penn Ave., Wilkinsburg, Pa.*

JOHN O. EMERSON, (Mechanical). Mining, and experimenting on wet treatments of refractory gold ores. *Shirley Hotel, Denver, Colo.*

EDWARD A. EPPLE, (Mechanical). Mech. D'ftsman, Missouri Pacific Ry. Co., '03-4. Machinist on Special Work, St. Louis, Iron Mountain & Southern Ry. Co., '04-5. *141 Riverside Ave., Little Rock, Ark.*

FAY L. FAUROTE, (Mechanical). M. Detroit Eng. Soc. Asst. Engr. Experimental Dept., Olds Motor Works, '03-5. Advertising Mngr. Olds Motor Works, '05 to date. *605 Walnut St., S. Lansing, Mich.*

Sidney M. Fechheimer, (Civil). D'ftsman, Am. Bdge. Co., Pittsburg, '03-4. Do. Trussed Concrete Steel Co., Detroit, '04 to date. *45 Adelaide St., Detroit, Mich.*

Neal C. Fenkell, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Riter-Conley Mfg. Co., Pittsburg, '03. Machinist, Westinghouse Mach Co., Pittsburg, '04. Tunnel Insp., Detroit Water Wks., '04-'05. D'ftsman, Detroit Water Wks. *273 Field Ave., Detroit, Mich.*

Donald M. Ferguson, (Civil). Estimating Dept., Geo. A. Fuller Co., '03-4. Estimator, Conroy Bros., '04-5. Do. Cranwell Const. Co., '05 to date. *153 W. 46th St., New York City, N. Y.*

*Harold R. Finney, (Mechanical).

*Albert C. Fitch, (Electrical).

Milton H. Freeman, (Civil). Asst. Engr. M. C. R. R., '03-5. Inspector, Penn., N. Y., and L. I. R. R. (East River Section of Penn. Tunnels), '05 to date. *116 Third St., Long Island City, N. Y.*

*William J. Fyan, (Civil).

Ralph D. Goodrich, (Civil). Asst. Engr. for H. E. Riggs, Toledo, O., '03-4. Do. Marine Basin Co., Brooklyn, N. Y., '04. Insp. Penn., New York & Long Island R. R., East River Section of Penn. Tunnels, '04-'06. Asst. Engr., State of Wyoming, March, '06 to date. *Office of State Engr., Cheyenne, Wyoming.*

George Grant, (Mechanical). M.S., '04. Held various positions with Mershon, Schuette & Parker, from graduation to Apr., '05. Machinist, W. B. Mershon & Co., Band Sawing Machinery, Apr., '05, to Oct., '05. Chief Engr., Mershon, Schuette & Parker, Oct. '05 to date. *1000 So. Jefferson Ave., Saginaw, Mich.*

Jay B. Harris, (Civil). Asst. Engr., Am. Bdge. Co., of New York, '03 to date. *749 E. University Ave., Ann Arbor, Mich.*

Walter E. Himes, (Mechanical).

Stephen A. Hoag, (Mechanical). Assoc. M. Am. Inst. E. E. Structural D'ftsman, Brown Hoist. Mach. Co., '01-2. Mechanical D'ftsman, Newburgh Steel Co. (Am. Steel & Wire Co.), '03-4. D'ftsman, Niagara Constr. Co., Ltd. (Ontario Power Co.), '04. Member of Eng. Corps, Telluride Power Co., Provo, '04-'05. Asst. Engr., Oregon Short Line Ry. Co., '05 to date. *C/o Oregon Short Line Ry. Co., Eng. Dept., Salt Lake City, Utah.*

Charles W. Howard, (Mechanical). D'ftsman, Riter-Conley Mfg. Co., '03-5. Do. Nat'l Tube Co., '05 to date. *554 Sixth St., McKeesport, Pa.*

Harry C. Hutchins, (Mechanical). M. Detroit Eng. Soc. Junior Member Am. Soc. of M. E. D'ftsman, Russel Wheel & Foundry Co., Detroit, '03-4. In Operating Dept., Detroit United Railway, '04. Appraisal Dept., with Field, Hinchman & Smith, Detroit, '04. In Mfg. and Constr. Dept., General Chemical Co., New York, '05. Am. Bdge. Co., New York, '05 to date. *311 W. 95th St., New York City, N. Y.*

Howard B. Keeney, (Mechanical).

John W. Kiehle, (Mechanical). Eng. Dept., Central District & Printing Telegraph Co., Pittsburg, '04-5. Eng. Dept., Amer. Telephone & Telegraph Co., '05 to date.
125 Milk St., Boston, Mass.

Earle K. Knight, (Civil). With Stearns Coal & Lumber Co., '03-4. Asst. Engr., Deschutes Irrigation & Power Co., '04 to date.
C/o Deschutes Irrigation & Power Co.,
Redmond, Crook Co., Ore.

Stuart K. Knox, (Civil). Rodman, City, Engr., Sault Ste. Marie, Mich., '02. Rodman, Lake Superior Power Co., Sault Ste. Marie, Ont., '02. Instrumentman for C. G. Wrentmore, Ann Arbor, Mich., '03. U. S. Insp., U. S. Army Engrs., Grand Rapids, Mich., '03. Asst. Engr., with C. L. Scherer, Beaumont, Tex., '04. Transitman, for W. A. Waldo, Houston, Tex., '04. Timekeeper and Material Man, Continental Bldg., Baltimore, Md., Thompson-Starrett Co., Aug. '04 to Apr. '05. Supt., Kenesaw Apt. House, Washington, do., Apr. to Sept. '05. Estimator on New Union Station, Washington, do., Sept. to Nov. '05. Civil Engr., New Union Station, Washington, do., Nov. to Dec. '05. Civil Engr., U. S. Express Realty Co.'s Bldg., New York City, do., Dec. '05 to Jan. '06. Asst. Supt., U. S. Express Realty Co.'s Bldg., New York, do., Jan. '06 to date.
316 W. 58th St., New York, N. Y.

William A. Lafler, (Civil). Junior Engr., U. S. Gov't, '03 to date.
Apartado 291 Monterey, Mexico.

†Arthur D. Lodewyck, (Mechanical).

Frank I. Louckes, (Civil). U. S. Recorder, Engr. Dept., U. S. Army, '03-4. U. S. Junior Engr. do., '04 to date.
1921 Barret Ave., Louisville, Ky.

†Don E. Marsh, (Civil).

Henry M. Milburn, (Chemical). Chemist in Office of Inspector of Asphalt and Cement, '03-6. Chemist, Conkling Co., South Chicago, '06 to date. *6216 Greenwood St., Chicago, Ill.*

†William R. Morley, (Civil).

†Ralph H. Morton, (Electrical).

Robert B. Otis, (Mechanical). Asst. Chief Insp., Packard Motor Car Co., '03-4. Chf. Insp. Standard Wheel Co., '04-5. Supt. Repair Dept., Woods Motor Vehicle Co., '05. Instr. in Eng. Dept., Univ. of Ill. *105 E. Green St., Champaign, Ill.*

Verner L. Page, (Civil). M. Detroit Eng. Soc. M. Detroit Architectural Club. D'ftsman, Russel Wheel & Foundry Co., '03-4. Instr. U. of M., '04. In charge of C. E. work, Field, Hinchman & Smith, '04-5. Asst. to Chief Engr., Trussed Concrete Steel Co., '06 to date. *573 Forest Ave., W., Detroit, Mich.*

Fred S. Parmenter, (Mechanical). With Atlantic Refining Co., Philadelphia, '03-5. Supt. Clay Mining Dept., Atlantic Refining Co., Ellenton, Fla., '05-6. *Ellenton, Fla.*

OSCAR G. JOSEPH, (Civil). Designer, Mount Vernon Bdge. Wks., '00-'01. D'ftsman, Am. Bdge. Co., Toledo, '01-3. Asst. Engr. L. & N. R. R. Co., '03-'06. Chief Engr., McDonald & Dod. Arch'ts, '06 to date.
101 E. St. Catherine St., Louisville, Ky.

ALFRED H. KNIGHT, (Mechanical). M. M. E. (Cornell), '01. D'ftsman, Eastern Shipbuilding Co., '01-2. Do. New York Shipbuilding Co., '02-3. Asst. Chf. D'ftsman, Hull Dept., Great Lakes Eng. Works, '03-5. *314 Vinewood Ave., Detroit, Mich.*

OTTO A. KRAUSE, (Mechanical). Supt., Hirth, Krause & Co., Shoe Mfgrs. do., Range River Elect. Light & Power Co.
Rockford, Mich.

ROBERT E. KREMERS, A.B. (Hope College) (Civil). D'ftsman, City Engr. Office. *Salt Lake City, Utah.*

WILLIAM LEHNARTZ, (Mechanical). A.M., '01. M. "Verein deutscher Ingenieure." D'ftsman, Allis Chalmers Co., '01-3. Do. Bucyrus Co., '04. Asst. to Supt. do., '04-'05. D'ftsman, Allis Chalmers Co., '05 to date.
173 S. Union St., Grand Rapids, Mich.

ORA M. LELAND, (Civil). Assoc. Member Am. Soc. C. E. Member Am. Assoc. for the Advancement of Science. Member Societé Belge d' Astronomie. M. Nat'l Geographic Soc. Chf. Clerk and D'ftsman, Office of U. S. Surveyor General of Florida, '98-9. Clerk (Division of Surveys), U. S. General Land Office, '00. Aid, U. S. Coast and Geodetic Survey, '00-2. Computer, do., '02-3. Clerk (Division of Surveys), U. S. General Land Office, '03. Instr. in Civil Eng., Cornell Univ., '03 to date. Surveyor to the U. S. Commissioner for the Demarkation of the Boundary between Alaska and Canada, '04 to date.
127 Cascadilla Place, Ithaca, N. Y.

ALFRED E. LINDAU, (Mechanical). M. Western Soc. of Engrs. Assoc. M. Am. Soc. C. E. Mem. W. S. Engrs. With Mich. Tax Commission, '00-'01. D'ftsman, Whiting F'dry Equip. Co., '01. Do. Wisconsin Bdge. & Iron Co., '01. Do. Bdge. Dept. C. B. & Q. Ry., '01-3. Asst. Engr., Bdge. Dept. C. R. I. & P. Ry., '03-5. Asst. Engr., St. Louis Expanded Metal Fire-proofing Co., '05. Company Engr., Expanded Metal & Corrugated Bar Co., '06 to date. *925 36 Frisco Bldg., St. Louis, Mo.*

CHESTER B. LOOMIS, (Mechanical). With Western Elect Co. D'ftsman, Brooks Locomotive Wks. *Dunkirk, N. Y.*

FREDERICK H. LOUD, (Civil). D'ftsman, Houghton County St. Ry., '00-'01. Asst. Engr., Atlantic Mining Co., on Redridge Dam., '01-2. Do. Phoenix Mining Co., '02-3. City Engr., Hancock. Mich., '03-4. Const. Engr., Rogers Construction Co., Civil Engr. for H. M. Loud's Sons Co., and A. S. & N. W. R. R. (Water Power Surveys), '04-5. Secy. and Sales Mngr., Buffalo Maple Flooring Co., '05 to date. *401 Delaware Ave., Buffalo, N. Y.*

GUY W. LUNN. Engr., Mich. Telephone Co., '00-2. Engr., Chicago Edison Co., '02 to date. *139 Adams St., Chicago. Ill.*

Royal J. Mansfield, (Civil). C.E., '02. Jun. Am. Soc. C. E. Aid, U. S. Coast Survey, '98-9. D'ftsman, Cambria Steel Co., '00-'01. Do. Riter-Conley Mfg. Co., '01-2. Asst. Engr. do., '02-4. Asst. Engr., chg. buildings, Wellman Seaver Morgan Co., '04 to date. *C/o Wellman Seaver Morgan Co., Cleveland, O.*

Harry S. Marsh, (Electrical). Asst. Elect. Engr., Pittsburg Plate Glass Co. *Fort City, Pa.*

Shigeru Matsuyama, (Mechanical). With Cornell Machine Co., Chicago. *Tokio, Japan.*

Walter B. Maurice, (Civil). M. Detroit Eng. Soc. Insp., Mich. State Tax Com'n, '00-'01. D'ftsman, Am. Bridge Co., '01-3. Do. Detroit Water Board (Civil Eng. Dept.), '03 to date. *1285 Jefferson Ave., Detroit, Mich.*

Henry A. McLean, (Mechanical). *Mayfair, Ont.*

Ezra B. Mead, (Mechanical). Ed. Dept. *Construction News. Chicago, Ill.*

William C. Miller, (Electrical). With Edison Ill'g Co. *Detroit, Mich.*

Frederick N. Nelles, (Civil). D'ftsman, Cambria Steel Co. *Johnstown, Pa.*

Arthur W. Norton, (Mechanical). With Norton Bros., '00-'05. Vice Prest. Continental Can Co., '05 to date. *4 Wabash Ave., Chicago, Ill.*

Floyd J. Page, (Mechanical). D'ftsman, Brown Hoist. Mach. Co., '00-'01. Do. Northern Eng. Wks., '01. D'ftsman and Checker, Whiting F'dry Equip. Co., '01-'05. D'ftsman, Link Belt Mach. Co., '05-'06. Estimating Engr., Whiting Fdy. Equip. Co., '06 to date. *15607 Lexington Ave., Harvey, Ill.*

Clarence J. Rannells, (Civil). With Cambria Steel Co. *Johnstown, Pa.*

Anton S. Rosing, (Civil). M. Western Soc. of Engrs. Rodman, Chicago & Northwestern Ry., '00-'02. Instrumentman do., '02-5. Resident Engr., Chicago Southern Ry., '05 to date. *Crete, Ill.*

Richard W. Runge, (Mechanical). B.S., E.E., '02. Testing Gasoline Engines, Fairbanks, Morse & Co., Beloit, Wis., 10 months. D'ftsman do., 8 months. D'ftsman and Checker, The Shaw Electric Crane Co., Muskegon, Mich., 1 year. D'ftsman and Insp., C. & N. W. Ry. Co., Chicago, Ill., 14 months. D'ftsman, Bucyrus Co., S. Milwaukee, Wis., 10 months. D'ftsman, Wisconsin Bridge & Iron Co., May, '05 to date. *North Milwaukee, Wis.*

Harry M. Sedgwick, (Mechanical). Sec'y and Treas., S. Wilks Mfg. Co., '00 to date. *5018 Washington Ave., Chicago, Ill.*

Alva F. Traver, (Mechanical). M. Mich. Gas Ass'n. M. Ohio Gas Ass'n. M. Western Gas Ass'n. D'ftsman, Grand Rapids Gas Light Co., '02. Asst. Supt. do., '02-3. Supt. do., '03 to date. *273 Lagrave St., Grand Rapids, Mich.*

Joseph J. Walser, (Civil). Purchasing Agt. and Asst. Supt., The Goss Printing Press Co., Chicago, '00 to date.
417 S. Central Ave., Austin, Chicago, Ill.

Charles M. Waters, (Civil). Insp., U. S., Ill. & Miss. Canal, '00-'02. Topographer, U. S., Ill. River Survey, '02-3. In charge of section of Ill. & Miss. Canal, '03-6. *Geneseo, Ill.*

Frederick J. Wilbur, (Civil). Rodman and Inspector, N. Y. C. & H. R. R. R. *Rochester, N. Y.*

Joseph W. Wood, (Electrical). Sec'y and Treas., Niles Steel Tank Co., formerly Freeland Mfg. Co. *Main St., Niles, Mich.*

George D. Wuerfel, (Mechanical). M. Toledo Soc. of Engrs. Mech. Engr., Toledo F'dry & Mach. Co., '00 to date.
226 Floyd St., Toledo, O.

†Jacob G. Young, (Civil). M. Western Soc. of Engrs. Chf. D'ftsman, Chicago Bridge & Iron Wks., '95-'00.

1901.

Leslie D. Anderson, (Mechanical). M. Lake Superior Min. Inst. Erecting Machinist and D'ftsman, Nordberg Mfg. Co., Milwaukee, '01-2. D'ftsman, Bucyrus Co., Milwaukee, '02-3. Mech. Engr., Champion Copper Co., Painesdale, Mich., '03-4. Checker. Bucyrus Co., Milwaukee, '04-5. Chief Engr., Arizona Smelting Co., Prescott, Ariz., '05 to date.
Val Verde, Yarapai Co., Ariz.

Emilio Arizpe, (Mechanical). Active Member of U. of M. Eng. Soc. for four consecutive years. Asst. Engr. to Prof. John R. Allen, in the Mackinac Island Works, '01. Insp. of Constr. at Mich. School of Mines. Charlton & Gilbert, Archts., Houghton, '01-'02. D'ftsman for Field, Hinchman & Smith, Detroit, '02-3. Asst. Engr. in charge of tunnels and canals, Mexican Light & Power Co., Ltd., Necaxa, Pa., Mexico, '03-'04. Left Necaxa in May, 1904. Present address. *Saltillo, Coahuila, Mexico.*

Wareham S. Baldwin, (Chemical). *Grand Rapids, Mich.*

Edward L. Benedict, (Mechanical). *Cleveland, O.*

Hubert W. Carpenter, (Mechanical). *Harvey, Ill.*

Washington H. Chapman, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Field & Hinchman, Cons. Engrs., '01. Supt. do., '02-3. Chief D'ftsman, Field, Hinchman & Smith, Engrs. and Arch'ts, '03-4. Engr. do., '04 to date.
619 McGraw Ave., Detroit, Mich.

Clarence Howard Clark, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Russel Wheel & Foundry Co., '01-2. Erector, Detroi United Ry., '02-3. Chf. D'ftsman, Lloyd Construction Co., '03 to date. *206 Stanley Ave., Detroit, Mich.*

Stephen P. Cobb, (Civil). M. Eng. Soc. of Western Penn. M. Western Gas Ass'n. D'ftsman, Am. Bdge. Co., '01-3. Engr. Elliott & Baton, Pittsburg, '03-4. Asst. in charge of Water Gas Dept., Station A, Laclede Gas Light Co., '04-5. Construction Insp. Gas Dept., Rochester Railway & Light Co., '05 to date.
C/o Rochester Railway & Light Co., Rochester, N. Y.

Charles B. Davis, (Civil). Asst. Chief Engr. D. L. & N. R. R., Summer of '01. Dredge Inspector and Transitman, U. S. Eng. Corps, '01-2. Asst. Engr., M. C. R. R., Summer '02. Instr., U. of M., '02. Supt. Mines, Allegheny Ore & Iron Co., '03. Transitman, Div. & Min. Engr., T. C. I. & R. R. Co., '04-6.
Johns, Jefferson Co., Ala.

Gustav B. Eggert, (Mechanical). *823 Willson Ave., Cleveland, O.*

Lewis M. Gram, (Civil). *Toledo, O.*

Guy P. Henry, (Mechanical). D'ftsman, Brown Hoist. Co., Cleveland, '01. Do. Russel Wheel & Foundry Co., Detroit, '01-'02. Do. Am. Bridge Co., Detroit, '02-3. Do. Garry Iron & Steel Co., Cleveland, '03. Establishing a cost system and general Mechanical Engineering, Chi. Portland Cement Co., LaSalle, Ill., '03-4. D'ftsman, Am. Bridge Co., Detroit, '04 to date.
522 Trumbull Ave., Detroit, Mich.

George S. Hill, (Civil). M. Western Soc. of Engrs. D'ftsman, Am. Bdge. Co., Toledo, '01-3. Designer, Scherzer Rolling Lift Bdge. Co., '03-4. Checker, Wisconsin Bdge. & Iron Co., '04. Asst. Engr., Scherzer Rolling Lift Bdge. Co., '04 to date.
3038 Groveland Ave., Chicago, Ill.

Alpheus E. Holcomb, (Mechanical). Member Am. Soc. of M. E.; full Member of Am. Foundrymen's Ass'n. D'ftsman, Industrial Wks., Bay City, '01-2. Asst. Chf. D'ftsman do., '02-5. Asst. Chf. Engr. do., '05. Designing Engr., Bucyrus Co., South Milwaukee, May to Oct., '05. Asst. Sales Agt., Featherstone Fdy. & Mach. Co., Chicago, Oct., '05, to March, '06. Designing Engr., F. C. Austin Drainage Excavator Co., Chicago, March, '06 to date. *2204 W. Van Buren St., Chicago, Ill.*

William C. Hornberger, (Mechanical). *Detroit, Mich.*

Raymond Fuller Horton, (Civil).
753 Campbell Ave., Detroit, Mich.

George D. Hudnutt, (Mechanical). D'ftsman, Studebaker Bros. Mfg. Co., S. Bend, Ind., '01-2. Do. Otis Elevator Co., Yonkers, N. Y., '02-4. Asst. Chf. D'ftsman, Otis Elevator Co., Chicago, '04 to date. *1055 Sheridan Road, Chicago, Ill.*

Edgar W. Kiefer, (Mechanical). D'ftsman, Detroit Shipbuilding Co., '01-3. Chief Engr., Mich. Sulphite Fibre Co., '03-6.
928 Seventh St., Port Huron, Mich.

William W. Kittleman, (Electrical). Test Dept., Western Elect. Co., Chicago, '02. Asst. Mngr., Elect. Equip. Co., Chicago,

'02-3. Assoc. Editor, *Western Electrician,* June to Dec., '02. Asst. Engr., Gen'l Power Imp. Co., Dec. '03 to Jan. '05. Selling Engr., Gen'l Elect. Co., Jan. '05 to date.
616 Fourteenth Ave., Detroit, Mich.

FREDERICK E. LEEFE, (Civil). *Sault Ste. Marie, Mich.*

CHARLES G. LEESON, (Mechanical). Erecting Engr., Underfeed Stoker Co. of America, June, '01, to April, '03. D'ftsman, Bucyrus Co., S. Milwaukee, April, '03, to Jan., '04. Head of Production Dept. do., Jan., '04 to date. *South Milwaukee, Wis.*

BERNARD H. LISKOW, (Mechanical).
291 Greenbush St., Milwaukee, Wis.

THOMAS L. B. LYSTER, (Electrical). M. M. E. (Cornell), 03. Assoc. Am. Inst. of E. E. Asst. Insp. of Dredging, U. S. Gov't, '01. Testing Dept., General Electric Co., '01-2. Graduate Student, Cornell Univ., '02-3. Construction Dept., Fort Wayne Electric Wks., '03. Asst. Engr., Westinghouse, Church, Kerr & Co., '03 to date.
C/o Westinghouse, Church, Kerr & Co., 10 Bridge St.,
New York, N. Y.

ANDREW H. McDOUGALL, (Mechanical). D'ftsman, Studebaker Bros. Mfg. Co., South Bend, Ind., '01-3. Do. Whiting Foundry Equip. Co., Harvey, Ill., '03-4. Estimator do., '04-'05. Chief D'ftsman do., July, '05 to date. *15420 Lexington Ave., Harvey, Ill.*

WALTER MACGREGOR, (Mechanical). M.E., '03. Foreman Mach. Shop, Detroit Plant, American Radiator Co., '01. D'ftsman, Whiting Foundry Equip. Co., Harvey, Ill., '02-3. D'ftsman, American Steel Foundries, '03-4. Constr. Engr. do., '04-5.
C/o American Steel Foundries, Pittsburg, Pa.

GEORGE D. McNAUGHTON, (Civil). Insp., Ralph Modjeski, Cons. Engr., '01-4. Do. Hildreth & Co., Cons. Engr., '04. Do. Pittsburgh Testing Laboratory, '04. Estimating Engr., Levering & Garriques Co., '05. *350 West 22nd St., New York, N. Y.*

RALPH M. MYERS, (Mechanical). Asst. Professor of Mathematics and Eng. in Univ. of S. Dakota. *Muir, Mich.*

ALFRED L. NEWTON, (Civil). C.E., '04. Sec'y and Treas. Newton Engineering Co., '02 to date. *424 Jackson St., Milwaukee, Wis.*

JOHN C. PARKER, (Mechanical). A.M., '02. E.E., '04. Assoc. Member Am. Inst. of E. E. Junior, Am. Soc. of C. E. Assoc. Mem. Am. Soc. M. E. Electrical Tester, General Electric Co., '02-3. Instr. in E. E. and M. E., Union Univ., '03-4. Asst. Engr. in charge Ontario Power Co., '04-'05. Asst. to Chief Engr., Iroquois Construction Co., '05 to date.
514 Fidelity Bldg., Buffalo, N. Y.

ARTHUR H. RICHARDSON, (Mechanical). With the Western Electric Co., '01-3. Asst. Employment Agent do., '03-4. Estimator of Manufacturing Costs do., '05-6.
341 Wisconsin Ave., Oak Park, Ill.

Eugene A. Rummler, (Mechanical). M. Western Soc. of Engrs., M. Patent Law Ass'n. D'ftsman, Detroit Dry Dock Co., '98-9. D'ftsman in charge of construction, Crescent Ship Yds., Elizabeth, N. J., '99-'01. Mechanical Expert and Solicitor of Patents, Member of firm, Rummler & Rummler, Patent Attorneys, Chicago, '01 to date. *1400-143 Dearborn St., Chicago, Ill.*

Louis E. Seas, (Civil). D'ftsman, Cambria Steel Co., '01. Do. Thompson-Starrett Co., '01-2. Estimator, U. S. Realty & Construction Co., '03. Engr. and Estimator, Levering & Garrigues Co., '04-5. *350 W. 22nd St., New York, N. Y.*

Leonard Shaw, (Mechanical). *179 Koch Ave., Detroit, Mich.*

Harry J. Sproat, (Mechanical). M.S., '02. D'ftsman, U. S. Lake Survey, '02. Do. Detroit Shipbuilding Co., '02-4. Eng. Dept. American Radiator Co., '05 to date. *1321 St. Antoine St., Detroit, Mich.*

Ernst Steck, (Electrical). Testing and Erecting, Western Elect. Co., '01-2. Asst. C. F. Drake, Mech. Engr., '02-3. In charge of Estimating Dept., Ft. Wayne Elect. Works, '03-5. Instr. in E. E., U. of M., '05-6. Elect. Engr. with Dodge & Day, Modernizing Engrs., '06 to date. *C/o Dodge & Day, Nicetown, Philadelphia, Pa.*

William W. Talman, (Mechanical). Asst. to Supt., Poland Mining Co., Feb. '01 to June '02. Sales Agt., St. Louis Car Wheel Co., July, '02 to date. *511 Bank of Commerce Bldg., St. Louis, Mo.*

James M. Wetmore, (Electrical). *541 Jefferson Ave., Detroit, Mich.*

Bert S. York, (Electrical). M. Internat'l Electrical Congress, St. Louis, '04. Chaser (Tel. Dept.), Western Elect. Co., also Dynamo Tester, '01-2. Construction work on high tension switchboards, Chicago Edison Co., '02-3. Engr., Cutler Hammer Mfg. Co., '03-5. Employed as Patent Expert on Power and Switchboard Apparatus, Western Elect. Co., Chicago, since May, '05. *1352 Lawrence Ave., Chicago, Ill.*

Claude E. Young, (Civil). Checker and Squad Boss, Cambria Steel Co., '01-5. *117 South St., Johnstown, Pa.*

Theodore F. H. Zealand, (Mechanical). M. Detroit Eng. Soc.; M. Westinghouse Electric Club; M. Western Railway Club. D'ftsman, Motive Power Dept., Mich Central Ry., '01-4. Do. Union Switch & Signal Co., Swissvale, Pa., '04 to date. *430 Maple Ave., Edgewood Park, Allegheny Co., Pa.*

1902.

Aikman Armstrong, (Mechanical). Secy. and Treas. Armstrong Woolen Co., '05 to date. *307 John R. St., Detroit, Mich.*

Arthur M. Barrett, (Civil). Vice-Pres't Barret Bindery Co., '02 to date. *3230 Calumet Ave., Chicago, Ill*

†James E. McAfee, (Mechanical). Designing and Estimating, Heating and Ventilating Dept., Thompson-Starrett Co., '04-5. **Material man on outside constr. do., '05 to date.**

*1909 I St., N. W., **Washington, D. C.***

†William C. McBain, (Mechanical). Jun. Mem. Am. Soc. M. E. Turbine and Gas Engine Tester, General Elect. Co., '04-5. **Computor, The William Tod Co.**

*78 **Williamson Ave., Youngstown, O.***

Harry E. McDonnell, (Mechanical). **Special D'ftsman, Eng. Estimating Dept., Newport News Shipbuilding & Dry Dock Co., Sept., '04 to date.** *123 **32nd St., Newport News, Va.***

†Fred M. McLean, (Civil). Insp. Board of Trustees, Commissioner of Water Wks., Cincinnati, O., '04-5. **Asst. Engr., Vera Cruz al Pacifico R. R., '05 to date.**

*Ferrocarril Vera Cruz al Pacifico, **Tierra Blanca, Vera Cruz,** Mexico.*

†John R. Mansfield, (Mechanical).

William J. Matthews, (Civil). Supt. of Constr., Weber Steel-Concrete Chimney Co., Chicago. **Real Estate Broker.**

*531 **First National Bank Bldg., Chicago, Ill.***

William B. May, (Civil). M. Univ. of Mich. Eng. Soc. On Field Surveys, Jackson & Suburban Traction Co., '01. Do. Jackson & Battle Creek Traction Co., '01-2. Asst. Engr., Plainwell Power Co., Plainwell, Mich., '02. Resident Engr., Riggs & Sherman Construction Co., Toledo, O., '03. **Asst. Chf. Engr., Duluth & Northern Minn. Ry., '04 to date.**

Knife River, Minn.

Oscar F. Mead, (Electrical).

Hubert H. Montague, (Electrical). M. Mich. Eng. Soc. **Student, Western Elect. Co., '04-5.** *585 **Congress St., Chicago, Ill.***

William C. Mundt, (Civil). Transitman, City Engr., Oil City, Pa., '04-5. **Asst. Engr., Buckeye Pipe Line Co., Lima, O., '05 to date.** *122 **N. Pierce St., Lima, O.***

John H. Mustard, (Electrical). M. Electric Club. Apprentice, Westinghouse Elect. & Mfg. Co., '04-5. **Engr. do., '05-6.**

*812 **Franklin Ave., Wilkinsburg, Pa.***

Oscar E. Olson, (Civil). Asst. Mining Engr., Oliver Iron Mining Co., '05. **Chief Mining Engr., Gogebic Range Mines of the Oliver Iron Mining Co., '06.**

*707 **Sutherland St., Ironwood, Mich.***

†Leon A. Paddock, (Civil). **Canadian Bdge. Co.**

Walkerville, Ontario.

Walter B. Perry, (Mechanical). D'ftsman, Gen'l Elect. Co., Lyn[illegible] Mass., '04. Curtis Turbine Test. do., '04-5. Special Machi[illegible] Shop Apprentice, The Wm. Tod Co., '05. **Asst. Supt., Indu[illegible]trial Works, Sept., '05 to date.**

*1014 **Birney St., Bay City, Mic[illegible]***

William E. Post, (Marine). D'ftsman, Great Lakes Eng. Wks., Hull Dept., Detroit, Oct., '04, to Jan., '06. In charge of Boiler Testing, Jones & Laughlin Steel Co., Pittsburg, Pa., Jan., '06 to March, '06. D'ftsman, Canadian Bridge Co., Ltd., Walkerville, Ont., March, '06 to date. *376 Jefferson Ave., Detroit, Mich.*

Jesse T. Pratt, (Mechanical). Machine Designing, L. A. Pratt, '04 to date. *415 Grant Place, Bay City, Mich.*

Harris P. Ralston, A.B. (Chemical). D'ftsman, The Solvay Process Co., '04-5. Foreman of Elect. Dept. do., '05. On Switchboard Design and Construction do., Dec., '05, Feb., '06. In Eng. Dept. do., Feb., '06 to date. *835 Jefferson Ave., Detroit, Mich.*

Birtram W. Ransom, (Civil). Dftsman, Am. Bdge. Co., Toledo, '04-5. Rodman, L. S. & M. S. Ry., Toledo, '05. Dftsman, also Superintending Const., Trussed Concrete Steel Co., Detroit, '05-6. Chief Engr., W. F. Kearns & Co., '06 to date. *161 Devonshire St., Boston, Mass.*

†Lewis C. Rogers, (Mechanical). M. Detroit Eng. Soc. Testing Engr., The Solvay Process Co., '04 to date. *The Solvay Process Co., Detroit, Mich.*

Sydney R. Russel, (Mechanical). M.S. '06. Dftsman, Great Lakes Eng. Wks., '05 to date. Resident Graduate U. of M., '05-'06. *863 Jefferson Ave., Detroit, Mich.*

John W. Seens, (Civil). M. Detroit Eng. Soc. Dftsman, Canadian Bdge. Co., Walkerville, Ont., June '04 to Oct. '05. Do., City Engr., Grand Rapids, Mich., Oct. '05 to Feb. '06. Do., Canadian Bdge. Co., Feb. '06 to date. *376 Jefferson Ave., Detroit, Mich.*

William Seymour, (Chemical). Chemist, Grand Rapids Gas Light Co., '04-'06. *275 Sheldon St., Grand Rapids, Mich.*

Carl H. Smith, (Civil). State Student Sec., Y. M. C. A., '04-5. Graduate Sec., University Students' Christian Assoc., '05-6. *215 So. State St., Ann Arbor, Mich.*

Morris H. Stimson, (Mechanical). M. Univ. of Mich. Eng. Soc. Apprentice Am. Radiator Co., Detroit, '04-6. *533 Woodward Ave., Detroit, Mich.*

Walter P. Stine, (Civil). Rodman on Panama Canal, '04. Levelman, do., '04-5. Asst. Engr., Republic of Panama, '05. Chief Engr., Prov. Los Santos, do., July to Nov. '05. Chief Engr., Prov. Veraguos, do., Nov. '05 to Feb. '06. Inspector of Bridges, 3 central provinces, do., Feb. '06 to date. *Aguadulce, Republic of Panama.*

Charles R. Swineford, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *568 Arcade Bldg., Dayton, O.*

†Juan F. R. Tecson, (Civil).

George G. Thompson, (Electrical). Machinist, Olds Motor Wks., '04. Asst. Power Dept., Edison Illum'g Co., '04-5. Dftsman, F. F. Van Tuyl, '05 to date. *485 2nd Ave., Detroit, Mich.*

Sidney M. Fechheimer, (Civil). D'ftsman, Am. Bdge. Co., Pittsburg, '03-4. Do. Trussed Concrete Steel Co., Detroit, '04 to date. *45 Adelaide St., Detroit, Mich.*

Neal C. Fenkell, (Mechanical). M. Detroit Eng. Soc. D'ftsman, Riter-Conley Mfg. Co., Pittsburg, '03. Machinist, Westinghouse Mach Co., Pittsburg, '04. Tunnel Insp., Detroit Water Wks., '04-'05. D'ftsman, Detroit Water Wks. *273 Field Ave., Detroit, Mich.*

Donald M. Ferguson, (Civil). Estimating Dept., Geo. A. Fuller Co., '03-4. Estimator, Conroy Bros., '04-5. Do. Cranwell Const. Co., '05 to date. *153 W. 46th St., New York City, N. Y.*

†Harold R. Finney, (Mechanical).

†Albert C. Fitch, (Electrical).

Milton H. Freeman, (Civil). Asst. Engr. M. C. R. R., '03-5. Inspector, Penn., N. Y., and L. I. R. R. (East River Section of Penn. Tunnels), '05 to date. *116 Third St., Long Island City, N. Y.*

†William J. Fyan, (Civil).

Ralph D. Goodrich, (Civil). Asst. Engr. for H. E. Riggs, Toledo, O., '03-4. Do. Marine Basin Co., Brooklyn, N. Y., '04. Insp. Penn., New York & Long Island R. R., East River Section of Penn. Tunnels, '04-'06. Asst. Engr., State of Wyoming, March, '06 to date. *Office of State Engr., Cheyenne, Wyoming.*

George Grant, (Mechanical). M.S., '04. Held various positions with Mershon, Schuette & Parker, from graduation to Apr., '05. Machinist, W. B. Mershon & Co., Band Sawing Machinery, Apr., '05, to Oct., '05. Chief Engr., Mershon, Schuette & Parker, Oct. '05 to date. *1000 So. Jefferson Ave., Saginaw, Mich.*

Jay B. Harris, (Civil). Asst. Engr., Am. Bdge. Co., of New York, '03 to date. *749 E. University Ave., Ann Arbor, Mich.*

Walter E. Himes, (Mechanical).

Stephen A. Hoag, (Mechanical). Assoc. M. Am. Inst. E. E. Structural D'ftsman, Brown Hoist. Mach. Co., '01-2. Mechanical D'ftsman, Newburgh Steel Co. (Am. Steel & Wire Co.), '03-4. D'ftsman, Niagara Constr. Co., Ltd. (Ontario Power Co.), '04. Member of Eng. Corps, Telluride Power Co., Provo, '04-'05. Asst. Engr., Oregon Short Line Ry. Co., '05 to date. *C/o Oregon Short Line Ry. Co., Eng. Dept., Salt Lake City, Utah.*

Charles W. Howard, (Mechanical). D'ftsman, Riter-Conley Mfg. Co., '03-5. Do. Nat'l Tube Co., '05 to date. *554 Sixth St., McKeesport, Pa.*

Harry C. Hutchins, (Mechanical). M. Detroit Eng. Soc. Junior Member Am. Soc. of M. E. D'ftsman, Russel Wheel & Foundry Co., Detroit, '03-4. In Operating Dept., Detroit United Railway, '04. Appraisal Dept., with Field, Hinchman & Smith, Detroit, '04. In Mfg. and Constr. Dept., General Chemical Co., New York, '05. Am. Bdge. Co., New York, '05 to date. *311 W. 95th St., New York City, N. Y.*

Howard B. Keeney, (Mechanical).

John W. Kiehle, (Mechanical). Eng. Dept., Central District & Printing Telegraph Co., Pittsburg, '04-5. Eng. Dept., Amer. Telephone & Telegraph Co., '05 to date.
125 Milk St., Boston, Mass.

Earle K. Knight, (Civil). With Stearns Coal & Lumber Co., '03-4. Asst. Engr., Deschutes Irrigation & Power Co., '04 to date.
C/o Deschutes Irrigation & Power Co.,
Redmond, Crook Co., Ore.

Stuart K. Knox, (Civil). Rodman, City, Engr., Sault Ste. Marie, Mich., '02. Rodman, Lake Superior Power Co., Sault Ste. Marie, Ont., '02. Instrumentman for C. G. Wrentmore, Ann Arbor, Mich., '03. U. S. Insp., U. S. Army Engrs., Grand Rapids, Mich., '03. Asst. Engr., with C. L. Scherer, Beaumont, Tex., '04. Transitman, for W. A. Waldo, Houston, Tex., '04. Timekeeper and Material Man, Continental Bldg., Baltimore, Md., Thompson-Starrett Co., Aug. '04 to Apr. '05. Supt., Kenesaw Apt. House, Washington, do., Apr. to Sept. '05. Estimator on New Union Station, Washington, do., Sept. to Nov. '05. Civil Engr., New Union Station, Washington, do., Nov. to Dec. '05. Civil Engr., U. S. Express Realty Co.'s Bldg., New York City, do., Dec. '05 to Jan. '06. Asst. Supt., U. S. Express Realty Co.'s Bldg., New York, do., Jan. '06 to date.
316 W. 58th St., New York, N. Y.

William A. Lafler, (Civil). Junior Engr., U. S. Gov't, '03 to date.
Apartado 291 Monterey, Mexico.

†Arthur D. Lodewyck, (Mechanical).

Frank I. Louckes, (Civil). U. S. Recorder, Engr. Dept., U. S. Army, '03-4. U. S. Junior Engr. do., '04 to date.
1921 Barret Ave., Louisville, Ky.

†Don E. Marsh, (Civil).

Henry M. Milburn, (Chemical). Chemist in Office of Inspector of Asphalt and Cement, '03-6. Chemist, Conkling Co., South Chicago, '06 to date. *6216 Greenwood St., Chicago, Ill.*

†William R. Morley, (Civil).

†Ralph H. Morton, (Electrical).

Robert B. Otis, (Mechanical). Asst. Chief Insp., Packard Motor Car Co., '03-4. Chf. Insp. Standard Wheel Co., '04-5. Supt. Repair Dept., Woods Motor Vehicle Co., '05. Instr. in Eng. Dept., Univ. of Ill. *105 E. Green St., Champaign, Ill.*

Verner L. Page, (Civil). M. Detroit Eng. Soc. M. Detroit Architectural Club. D'ftsman, Russel Wheel & Foundry Co., '03-4. Instr. U. of M., '04. In charge of C. E. work, Field, Hinchman & Smith, '04-5. Asst. to Chief Engr., Trussed Concrete Steel Co., '06 to date. *573 Forest Ave., W., Detroit, Mich.*

Fred S. Parmenter, (Mechanical). With Atlantic Refining Co., Philadelphia, '03-5. Supt. Clay Mining Dept., Atlantic Refining Co., Ellenton, Fla., '05-6. *Ellenton, Fla.*

Robert R. Thomson, (Mechanical). Testing Dept., General Elect. Co., '04-'05. Commercial Dept., do.
838 Union St., Schenectady, N. Y.

John S. Tyler, (Mechanical). Special Apprentice, P. C. C. & St. L. R. R., Apr. '04 to date. *212 N. 19th St., Columbus, O.*

Ralph A. Vail, (Mechanical). Experimental Dept., Olds Motor Wks., '04-6. Experimental Dept., H. H. Franklin Mfg. Co., March '06 to date.
C/o H. H. Franklin Mfg. Co., Syracuse, N. Y.

†John M. Van Splunter, (Electrical). With Allington & Co., Heating and Ventilating Engrs. *Saginaw, Mich.*

Oswald W. Visscher, (Electrical). A.B. (Hope) '01. A.B. (U. of M.) '02. Student, Western Elect. Co., '04-5. Salesman, do., '05-6. *Riverside, Ill.*

Donald C. Waite, (Civil). Jun. Mem. Am. Soc. C. E. Rodman, Interborough Rapid Transit Co., of New York City, '04-'05. Transitman, do., '05. Transitman, Westinghouse, Church, Kerr & Co., New York City, Nov. '05 to date.
17 Greenvale Ave., Yonkers, N. Y.

William T. Walker, Jr., (Mechanical and Electrical). M. Toledo Soc. of Engrs. Dftsman, F. F. Van Tuyl, Detroit. Mngr. Branch Office, Toledo, '04-5. Chief Dftsman, Timken Roller Bearing Axle Co., Nov. '05 to date.
607 W. Tuscarawas St., Canton, O.

Otto C. Walther, (Electrical). Testing Dept., General Elect. Co., '04-5. Calculating Dept. of Experimental Turbines, do., '05-6.
407 Brandywine Ave., Schenectady, N. Y.

Edward N. Walton, (Mechanical). Engine Testing, Fairbanks, Morse & Co., '04-5. Engine Erector, do., at Cincinnati and Cleveland, '05-6. Dftsman, Osborne Eng. Co., '06 to date.
64 Collins Place, Cleveland, O.

Charles A. Waring, (Mechanical). Dftsman, Kenneth Anderson Mfg. Co., '04-5. Do., Ford Motor Co. Do., Northern Mfg. Co. Do., Packard Motor Car, '06.
597 Champlain St., Detroit, Mich.

Edward A. Weiland, (Mechanical and Electrical). Dftsman, Solvay Process Co., '04-5. Asst. Chf. Dftsman, do., '05-6. Chf. Engr., Mngr. Dept. of Masonry and Concrete Construction, Vinton Company, General Contractors, '06 to date.
19 Cottrell Ave., Detroit, Mich.

Alfred H. White, (Chemical). A.B. '93. M. Am. Chem. Soc. M. Soc. of Chem. Industry. M. Mich. Gas Ass'n. Asst. Professor of Chem. Technology, U. of M., '04 to date.
1017 Hill St., Ann Arbor, Mich.

John A. Whiting, (Civil). Field Asst. State Engr. of Wyo., Summer '04. Engaged in private practice, Oct. '04 to June '05. Field Asst., State Engr. of Wyoming, Summer '05. Chief Engr. North Platte & Encampment Canal Co., since Oct. '05
Encampment, Wyoming.

†Carlos A. Williston, (Civil).

Vernon C. Wood, (Marine). Dftsman, Manitowoc Dry Dock Co., '04-Oct. '05. *56 Langley Ave., Detroit, Mich.*

Jesse C. Wright, (Civil). M. So. California Engrs. and Arch'ts Assoc. Dftsman, City Engr., Los Angeles, to date. *1227 W. 8th St., Los Angeles, Cal.*

†Arton E. Yokom, (Civil). Rodman, Panama Canal, '04-5. Levelman, do., '05 to date. *Gladstone, Mich.*

1905.

Robert E. Andrews, (Civil). M. Detroit Eng. Soc. Dftsman, Detroit Water Board (C. E. Dept.), '05 to date. *91 Winder St., Detroit, Mich.*

†Harold G. Bandfield, (Electrical).

Joel M. Barnes, (Chemical). M. Mich. Jr. Research Club. M. Sigma Xi. Holder of Gas Eng'g Fellowship, U. of M., '05-'06.

John W. Bell, (Civil). Dftsman, Russel Wheel & Foundry Co., '05 to date. *216 Hancock West, Detroit, Mich.*

†Rolla L. Bigelow, (Civil).

†David T. Bjork, (Civil).

†Harry A. Brown, (Electrical).

James A. Brown, (Mechanical). Engr. Grand Rapids Gas Lt. Co., '05 to date. *75 Cass Ave., Grand Rapids, Mich.*

Louis E. Burton, (Mechanical). In Shop Am. Blower Co., June-Aug. '05. Detroit Sales Agt., do., Aug. '05-Jan. '06. Chicago Asst. Sales Agt. do., Jan. '06 to date. *5206 Madison Ave. (Hyde Park), Chicago, Ill.*

Orville B. Carlisle, (Civil). Structural Dftsman Am. Bridge Co., '05 to date. *Ambridge, Pa.*

Leon C. Coller, (Electrical). Student M. Amer. Inst. Elec. Engrs. Experimental Telephone Engr., Western Electric Co., 6 mos. In charge of Telephone Power Plant apparatus testing and inspection, do., 3 mos. *170 Ashland Blvd., Chicago, Ill.*

Ross M. Coomer, (Civil). Instrumentman Penn. R. R., Altoona, Pa., July '05-Jan. '06. Dftsman, Erie R. R., N. Y. City, Jan. '06 to date. *138 Washington Ave., Belleville, N. J.*

Arthur J. Decker, (Civil). Jun. Amer. Soc. C. E. Dftsman, City of Columbus, Ohio, '05 to date. *1192 East Mound St., Columbus, Ohio.*

†Rollo W. Detwiler, (Mechanical).

Henry C. Dewey, (Civil). M. Eng'g Assoc. of the South. Asst. Engr., N. C. and St. L. Ry., '05-6. *C/o N. C. and St. L. Ry., Paducah, Ky.*

Harold S. Dickerson, (Electrical). M. Am. Inst. of E. E. Signal Repairman, Penn. Lines, Headquarters at Fort Wayne, Ind., June '05-Aug. '05. Asst. in Experimental Eng'g, Purdue Univ., Sept. '05 to '06. *323 W. Haggard St., LaFayette W., Ind.*

†William H. Distin, Jr., (Marine).

Byron W. Dunham, (Mechanical). Dftsman, Jones & Laughlin Steel Co., Pittsburgh S. S., Pa., '05-6. *Crafton, Pa.*

Robert B. Ellsworth, (Mechanical). Signal Foreman and Inspector, M. C. R. R., '01-5. Signal Inspector Electric Zone, N. Y. C. & H. R. R. R., '06. *1245 Grand Central Station, New York, N. Y.*

John A. Ferguson, (Chemical). A.B. '03. Research work, General Electric Co., '05 to date. *229 Glenwood Boulevard, Schenectady, N. Y.*

†Carl H. F. Fischer, (Chemical).

Claude J. Fry, (Mechanical). Tool Designer, Allis-Chalmers Co., June '05 to Oct. '05. Dftsman, do., Oct. '05 to Feb. '06. Checker, Files & Stowell Co., Feb. '06. *227 Greenbush St., Milwaukee, Wis.*

†James S. Fulton, (Mechanical).

Albert L. Gayer, (Electrical). With Western Electric Co., since graduation to date. *259 So. Clinton St., C/o Western Electric Co., Chicago, Ill.*

Edwin L. Gemmill, (Mechanical). Clerk, The Sharpsville Steam Boiler Works, James R. Gemmill, Propr., '05 to date. *Sharpsville, Pa.*

John O. Gilbert, (Electrical). Apprentice, Westinghouse Electric & Mfg. Co., '05-'06. *905 Franklin St., Wilkinsburg, Pa.*

Earl D. Glidden, (Mechanical). Dftsman, Sheffield Car Co. *816 7th St., Three Rivers, Mich.*

Ralph O. Gooding, (Electrical). Student Member. Am. Inst. E. E. Eng'g Apprentice, Western Electric Co., Hawthorne, Ill., '05 to date. *Morton Park, Ill.*

Ralph S. Gram, (Civil). With Interborough Rapid Transit Co., '05 to date. *130 W. 84th St., New York City, N. Y.*

Alexander M. Graver, (Mechanical). M.S. '06. Asst. in Mech. Eng'g, U. of M., '05-6. *910 Cornwell Place, Ann Arbor, Mich.*

†Gilbert R. Haigh, (Mechanical).

Omar I. Hall, (Mechanical). Instr. Mech. Drawing, DuPont Man. Train. H. S., '05 to date. *311 W. St. Catherine St., Louisville, Ky.*

Sidney T. Harding, (Civil). Dftsman for Gardner S. Williams, June to Nov., '05. Recorder, U. S. Lake Survey, Nov. '05 to date. *C/o U. S. Lake Survey, 33 Campau Bldg., Detroit, Mich.*

†Charles E. Hayes, (Civil).

Howard B. W. Howie, (Civil). B. S. in Mar. E., Oct. '05. M. Eng'g Assoc. of the South. Jun. M. Am. Soc. of C. E. Asst. City Engr., Chattanooga, Tenn., July '05 to date. *215 Oak St., Chattanooga, Tenn.*

John H. Hunt, (Electrical). Eng'g Apprentice, Western Electric Co., '05-6. *Morton Park, Ill.*

CYRIL M. JANSKY, (Electrical). M. Am. Inst. of E. E. M. Bohemian Math. and Physical Soc. of Prague, Bohemia. M. Sigma Xi. Asst. in Physics, U. of M., '03-4. Laboratory Asst., Nat'l Bureau of Standards, '04-5. Prof. of Physics and E. E., Univ. of Okla., '05 to date. ***Norman, Okla.***

†CLARENCE R. JONES, (Mechanical).

DANIEL W. KIMBALL, (Civil). Recorder, U. S. Eng. Dept., '05. Inspector, do., '05-6. Asst. Engr. (Bld. Construction), O. & W. Thum Co., Grand Rapids, '06 to date. *93 Sheldon St., Grand Rapids, Mich.*

WILLIAM KLETZER, (Electrical). Dftsman, Packard Motor Car Co., '05-6. Sales Engr., Fairbanks, Morse & Co., '06 to date. *625 Harrison Ave., Beloit, Wis.*

ARTHUR E. KUSTERER, (Civil). Bond Salesman, Edward M. Deane & Co., Aug. '05-March '06. Do., Child, Hulswit & Co., March '06 to date. *327 Fountain St., Grand Rapids, Mich.*

†DANIEL W. LATHROP, (Mechanical).

RUDOLPH LEWEN, (Civil). Dftsman, The Roe Stephens Mfg. Co., Detroit, '05-6. Do., Westinghouse, Church, Kerr & Co., '06 to date. *2015 Madison Ave., New York City, N. Y.*

ARTHUR T. MACDONALD, (Civil). U. of M. Eng'g Soc. Asst. Engr., Helena Power Transmission Co., '05 to date. *Houserlake, Mont.*

RALPH W. MCMULLEN, (Mechanical). Senior Eng'g Soc., U. of M. Student Member, Am. Inst. of E. E. Dftsman, Western Electric Co., Chicago, '05-6. *Riverside, Ill.*

WILLIAM H. MEESE, (Electrical). Apprentice, Western Electric Co., July '05 to date. *170 Ashland Blvd., Chicago, Ill.*

HORACE G. MERRICK, (Civil). Recorder, U. S. Lake Survey, '05 to date. *33 Campau Bldg., Detroit, Mich.*

HORACE W. MILLER, JR. (Marine). M.S. '06. Post-graduate student at U. of M., '05-6. *905 Forest Ave., Ann Arbor, Mich.*

MORTIMER C. NICHOLS, (Civil). Dftsman, Am. Bridge Co., '05 to date. *Box 293, Ambridge, Pa.*

†WILLIAM B. NORTH, M.D., (Chemical).

HARLEY E. OLSON, (Chemical). Asst. Chemist, Union Pacific R. R. Co., '05 to date. *823 So. 23rd St., Omaha, Nebr.*

FRANK K. OVITZ, (Chemical). M. Am. Chem. Soc. Instr., Univ. of Ill., Sept. '05 to Feb. '06. Chemist, Eng'g Experiment Station, Feb. '06 to date. *1105 W. Oregon St., Urbana, Ill.*

RALZEMOND D. PARKER, (Electrical). M.S. '06. M. Eng'g Soc., U. of M. Contracting Dept., Edison Illuminating Co., Detroit, July to Oct. '05. Asst. in Mech. Eng'g, U. of M., Oct. '05 to June '06. *308 Madison St., Ann Arbor, Mich.*

JOSEPH A. PARKS, (Mechanical). Field Engr., North Western Fuel Co., '05-6. *1311 John Ave., Superior, Wis.*

WILLIAM L. PEARSON. (Civil). Asst. in Drawing. U. of M., April to June, '05. Recorder. U. S. River and Harbor Survey, Aug. and Sept. '05. Transitman. City Engr. Office. Grand Rapids. '05-6.
30 Dwight Ave., Grand Rapids, Mich.

CHARLES F. PECK (Civil). Asst. in Eng'g Corps. Penn. Lines, west of Pittsburgh, July '05 to April '06. Asst., C. B. & Q. Ry., April '06 to date.
323 13th St., Lincoln, Nebr.

EDWARD F. PERKINS. (Electrical). Apprentice. Fairbanks, Morse & Co., '05 to date.
915 Bushnell St., Beloit, Wis.

ARTHUR M. REBSTOCK. (Mechanical). Sales Engr., Fairbanks, Morse & Co., '05 to date.
625 Harrison Ave., Beloit, Wis.

WALTER C. REIBLING. (Chemical). Asst. Chemist, Grasselli Chem. Co., July to Sept. '05. Stillman and Chemist, Barret Mfg. Co., Sept. '05 to date.
3247 Vernon St., Chicago, Ill.

REX D. RICHARDSON. (Civil). Structural Dftsman, Am. Bridge Co., Ambridge, Pa., '05. Do., Westinghouse, Church, Kerr & Co., '05 to date.
138 Washington Ave., Belleville, N. J.

EDWIN SCHNECK. (Marine). Ship Dftsman, Great Lakes Eng'g Works, '05 to date.
440 Brush St., Detroit, Mich.

MARTIN R. SCHOBER. (Civil). M. Eng'g Soc., U. of M. Dftsman, Cambria Steel Co., Johnstown, Pa., July '05 to Feb. '06. Do., McClintic Marshall Construction Co., Pittsburg, Feb. '06 to date.
7329 Dennison Ave., Swissvale, Pa.

DONALD D. SMITH. (Civil). Time-keeper, Geo. A. Fuller Co., May '05 to Nov. '05. Engr., Thompson Starrett Co., Nov. '05 to date.
1311 30th St., N. W., Washington, D. C.

†JAMES F. SMITH. (Mechanical).

WALTER C. SMITH. (Electrical). Student member, Am. Inst. of E. E. In Testing Dept., General Electric Co., '05 to date.
132 Park Ave., Schenectady, N. Y.

SHERWOOD H. STANDISH. (Mechanical). Asst. to Supt., Mich. Malleable Iron Co., Sept. '05 to Jan. '06. Repr. of company on the work during building of new plant, Monarch Steel Castings Co., '06 to date.
117 Watson Ave., Detroit, Mich.

DEE J. STERRETT. (Civil). Asst. in Summer School Camp, Summer '05. Instr. man, Huron River Valley Survey, Aug. and Sept. '05. Asst. Engr., Detroit River Tunnel Co., Sept. '05 to date.
164 West Fort St., Detroit, Mich.

JAMES STOKOE. (Mechanical). Dftsman, Isthmian Canal Com'n, '05-6.
Culebra, Canal Zone, C/o Supt. M. P. & M.

RALPH A. STOW. (Electrical). M. Eng'g Soc., U. of M. M. Mich. Branch, Am. Inst. E. E. General Sec'y, Purdue Y. M. C. A., '05-6.
147 Sheetz St., W. LaFayette, Ind.

DELMAR E. TEED. (Civil). M. Mich. Eng'g Soc. Partner, A. J. Teed & Son, '99-'06.
Cadillac, Mich.

FRED R. TEMPLE. (Electrical). With Mich. State Telephone Co., July '05 to date.
480 Hancock Ave., W., Detroit, Mich.

Ralph R. Tinkham, (Civil). Graduate member, Eng'g Soc., U. of M. Jun. Am. Soc. C. E. Instr. of Surveying, U. of M., Summer '05. Dftsman with Gardner S. Williams, Cons. Engr., Aug. '05 to date. Graduate Student in C. E., U. of M., '05-6.
232 So. Ingalls, Ann Arbor, Mich.

Reginald H. Towler, (Marine). Ship Dftsman, Great Lakes Eng'g Works, '05-6. *444 Vinewood Ave., Detroit, Mich.*

†**Warren W. Tracy**, (Mechanical).

†**Carmi J. Tryon, Jr.**, (Chemical).

†**Carl H. Upmeyer**, (Civil).

John M. Van Splunter, (Electrical). Testing Engr., Allington & Curtis Mfg. Co., Saginaw, Feb. '05 to May '05. Eng'g Dept., Whiting Foundry Equipment Co., June '05 to Aug. '05. Do., Sargent & Lundy, Consulting Engrs., Aug. '05 to date.
1454 Michigan Ave., Chicago, Ill.

†**Frederick G. Wahl**, (Chemical).

Henry G. Watson, (Civil). Dftsman, State Eng'g Office, July '05 to date. *Box 254, Cheyenne, Wyo.*

Don B. Webster, (Mechanical). Dftsman, Cadillac Motor Car Co., '05-6. *55 Smith Ave., Detroit, Mich.*

†**Richard A. Welch**, (Electrical).

†**Daniel A. White**, (Civil).

Lawrence C. Whitlark, (Mechanical). In charge of Experimental Dept., Foos Gas Engine Co., June '05 to May '06.
35 West Liberty St., Springfield, O.

James D. Whitmore, (Mechanical). Dftsman, Sheffield Car Co., July '05 to Jan. '06. Do., Solvay Process Co., Jan. '06 to date.
19 Cottrell Ave., Detroit, Mich.

Lyle A. Whitsit, (Civil and Marine). M. Eng'g Soc. of U. of M. Jun. Am. Soc. of C. E. Asst. Engr., Am. Falls Canal & Power Co., Idaho, June to Dec. '05. Dftsman, McClintic Marshall Const. Co., Chicago, to date.
230 E. 54th Place, Chicago, Ill.

†**Samuel Wilson**, (Civil).

William K. Wilson, (Electrical). Tester, General Electric Co., July '05 to date. *45 Front St., Schenectady, N. Y.*

John J. Woolfenden, (Electrical). M.S. '06. Student, Am. Inst. of E. E. Special Salesman, Frank C. Teal Co., Summer '05. Asst. in Mech. Eng'g, U. of M., '05-6.
1227 So. Univ. Ave., Ann Arbor, Mich.

†**James H. Young**, (Mechanical).

Otto S. Zelner, (Civil). Asst. Instr. in Surveying Camp, U. of M., Summer '05. Instr. man, Huron River Survey, under supervision of Prof. G. S. Williams, Aug. to Oct. '05. Recorder U. S. Lake Survey, Oct. '05 to date.
33 Charlotte Ave., Detroit, Mich.

EARL A. FORKNER, (Electrical). Shop and Testing, Western Electric Co., '04-5. Power App. Sales do., '05 to date.
246 E. 60th St., Chicago, Ill.

DAVID R. FRASER, JR., (Mechanical). M. Eng. Soc. of Milwaukee. Machinist, Power & Mining Mach. Co., at Cudahy, '04. D'ftsman and in Experimental Dept. do., '04 to date.
462 Van Buren St., Milwaukee, Wis.

CHARLES A. FULLER, (Mechanical). Hon. Mem. of Univ. of Pa. Eng. Soc. D'ftsman, Murphy Iron Wks., '04-5. D'ftsman, Great Lakes Eng. Wks., '05. Instr. in Mech. Eng. at Univ. of Penn., since Sept.' '05. *3708 Spruce St., Phildelphia, Pa.*

†THOMAS G. GALE, (Mechanical). In lumber business with the Gale Lumber Co., since graduation. *West Branch, Mich.*

JOHN A. GARRETT, (Mechanical). M. U. of M. Eng. Soc. Engine Dept., Fairbanks, Morse & Co., Beloit, '04-5. Exhibit Engr. do., Lewis & Clark Exposition, Portland, Ore., '05. Gas Engine and Mech. Engr. do., Los Angeles, '06 to date.
136-138 Los Angeles St., Los Angeles, Cal.

GEORGE W. GILKEY, (Mechanical). With the Michigan Paper Co. since graduation. *Plainwell, Mich.*

HEBRERT S. GRAVER, (Civil). D'ftsman, Wm. Graver Tank Wks., '04 to date. *7211 Yale Ave., Chicago, Ill.*

†ARTHUR C. GREEN, (Mechanical). D'ftsman, Bucyrus Co., '04-5.
Box 24, South Milwaukee, Wis.

MARK H. GREGG, (Mechanical). M.S., '05. Asst. in M. E., U. of M., '04-5. Assisting Engr., Willcox Eng'g Co., '05 to date.
408 S. Jefferson St., Saginaw, Mich.

BERTRAM V. R. HALL, (Civil). D'ftsman, City Engr's Office, Grand Rapids, Mich., '04. Asst. City Engr., Manistee, Mich., '04. Estimator, Converse Bdge. Co., '05. Asst. Engr. do., '06.
Chattanooga, Tenn.

MORRIS A. HALL, (Mechanical). Junior Mem. Am. Soc. M. E. In charge erection work, shop of Whitehead & Kales Iron Wks., Detroit, '04-5. Chf. D'ftsman, office of F. A. Shoemaker, M.E., Buffalo., '05. Designer, Iroquois Iron Wks., Buffalo, N. Y. three months. Chief D'ftsman, Mack Bros., Motor Car Co., Allentown, Pa., '05-6. Do. Motor Car Dept., Sheffield Car Co., Three Rivers, Mich., '06 to date.
218 East St., Three Rivers, Mich.

ROLLAND S. HALL, (Civil). Eng'g Aid, Reclamation Service, U. S. Geol. Survey, '04 to date.
C/o U. S. Geological Survey, Pendleton, Ore.

HARRY A. HARRIS, (Electrical). M. Mich. Eng. Soc. Telephone Switchboard Engr., Stromberg-Carlson Tel. Mfg. Co., '04-5. Power Engr. do., '05-6. Chief D'ftsman and Power Engr do., '06 to date. *46 Vick Park "A." Rochester, N. Y.*

Max P. Heavenrich, (Civil). M. U. of M. Eng. Soc. Transit, U. S. Gov't Light House. D'ftsman, Canadian Bdge. Co. D'ftsman on Construction Work, Trussed Concrete Steel Co.
C/o Trussed Concrete Steel Co., Detroit, Mich.

Edward L. Hogan, (Electrical and Mechanical). M.S., '05. M. Sigma Xi. Graduate Student in Dept. of Eng., U. of M., '04-5. Asst. in Mech. Eng., U. of M., '04-5. Engr. in charge of Heating and Ventilating Work, American Blower Co., Detroit, July, '05 to date. *1096 Cass Ave., Detroit, Mich.*

William M. Hogle, (Mechanical). M. Mich. Eng. Soc. M. Toledo Soc. of Engrs. D'ftsman, E. G. Staude, Builder and Designer Special Mach., Minneapolis, '04. Do. Olds Motor Works, Detroit, '04. Do. Olds Motor Works, Lansing, '04. Designing D'ftsman, Pope Motor Works, Toledo, '04-5. Gas Engine Designer and Checker, Consolidated Mfg. Co., Toledo, '05. D'ftsman, C. T. & D. S. L. Ry., Toledo, '05. Engr. in Charge of Constr., Defiance Div. C. T. & D. S. L. Ry., '05. Mech. and Civil Eng'g, Champe & Hogle, 710 The Nasby, to date.
2333 Robinwood Ave., Toledo, O.

Arthur Holmes, (Mechanical). Junior, Am. Soc. M. E. M. Technology Club of Syracuse. Experimental Dept., Olds Motor Works, Detroit, '04-5. Experimental Dept., H. H. Franklin Mfg. Co., Sept., '05 to date. *210 Fitch St., Syracuse, N. Y.*

†Harold Hooker, (Civil). Estimator, J. C. McFarland & Co., '04 to date.
C/o J. C. McFarland & Co., 27th St. and 5th Ave., Chicago, Ill.

†Samuel Horner, (Civil).

William O. Houston, (Civil). Asst. Engr., Ann Arbor R. R., '03-4. Instrumentman, Mich. Central R. R., '04. Asst. Engr., East Louisiana R. R. '05. Resident Engr., New Orleans Great Northern R. R., '05 to date. *Lenoir, Miss.*

Cortes Johnson, (Civil). Asst. in Civil Eng'g, Iowa State College, '04-5. Levee Engr., DesMoines & Miss. Levee Dist. No. 1, '05 to date. *La Grange, Mo.*

Clarence L. Keller, (Electrical). Student Member Am. Inst. E. E. D'ftsman, Detroit United Ry., Mech. Dept., '04 to date.
83 Leverette St., Detroit, Mich.

†Stewart B. Kingsbury, (Marine). Goodrich Steamship Line, '04. Racine Boat Co., '04. *Muskegon, Mich.*

Lester Kirschbraun, (Chemical). M. Am. Chem. Soc. Asst. Chemist, Union Pacific R. R., '04-'05. Chemist, City of Omaha, Eng. Dept., '05 to date. *1046 Georgia Ave., Omaha, Nebr.*

Walter F. Kneip, (Mechanical). Jun., Am. Soc. M. E. Exp. Dept., Olds Motor Works, '04 to date. *315 Allegan St., Lansing, Mich.*

Harlow Lewis, (Civil). Timekeeper, Thompson-Starrett Co., '02-3. Engr. do., '03-4. Supt. do., '04-'05. Supt. of Bldg. Construction, Canadian White Co., Ltd., '05 to date.
C/o Canadian White Co., Ltd., Sovereign Bank Bldg.,
Montreal, Canada.

†James E. McAfee, (Mechanical). Designing and Estimating, Heating and Ventilating Dept., Thompson-Starrett Co., '04-5. Material man on outside constr. do., '05 to date.
1909 I St., N. W., Washington, D. C.

†William C. McBain, (Mechanical). Jun. Mem. Am. Soc. M. E. Turbine and Gas Engine Tester, General Elect. Co., '04-5. Computor, The William Tod Co.
78 Williamson Ave., Youngstown, O.

Harry E. McDonnell, (Mechanical). Special D'ftsman, Eng. Estimating Dept., Newport News Shipbuilding & Dry Dock Co., Sept., '04 to date. *123 32nd St., Newport News, Va.*

†Fred M. McLean, (Civil). Insp. Board of Trustees, Commissioner of Water Wks., Cincinnati, O., '04-5. Asst. Engr., Vera Cruz al Pacifico R. R., '05 to date.
Ferrocarril Vera Cruz al Pacifico, Tierra Blanca, Vera Cruz, Mexico.

†John R. Mansfield, (Mechanical).

William J. Matthews, (Civil). Supt. of Constr., Weber Steel-Concrete Chimney Co., Chicago. Real Estate Broker.
531 First National Bank Bldg., Chicago, Ill.

William B. May, (Civil). M. Univ. of Mich. Eng. Soc. On Field Surveys, Jackson & Suburban Traction Co., '01. Do. Jackson & Battle Creek Traction Co., '01-2. Asst. Engr., Plainwell Power Co., Plainwell, Mich., '02. Resident Engr., Riggs & Sherman Construction Co., Toledo, O., '03. Asst. Chf. Engr., Duluth & Northern Minn. Ry., '04 to date.
Knife River, Minn.

Oscar F. Mead, (Electrical).

Hubert H. Montague, (Electrical). M. Mich. Eng. Soc. Student, Western Elect. Co., '04-5. *585 Congress St., Chicago, Ill.*

William C. Mundt, (Civil). Transitman, City Engr., Oil City, Pa., '04-5. Asst. Engr., Buckeye Pipe Line Co., Lima, O., '05 to date. *122 N. Pierce St., Lima, O.*

John H. Mustard, (Electrical). M. Electric Club. Apprentice, Westinghouse Elect. & Mfg. Co., '04-5. Engr. do., '05-6.
812 Franklin Ave., Wilkinsburg, Pa.

Oscar E. Olson, (Civil). Asst. Mining Engr., Oliver Iron Mining Co., '05. Chief Mining Engr., Gogebic Range Mines of the Oliver Iron Mining Co., '06.
707 Sutherland St., Ironwood, Mich.

†Leon A. Paddock, (Civil). Canadian Bdge. Co.
Walkerville, Ontario.

Walter B. Perry, (Mechanical). D'ftsman, Gen'l Elect. Co., Lynn, Mass., '04. Curtis Turbine Test. do., '04-5. Special Machine Shop Apprentice, The Wm. Tod Co., '05. Asst. Supt., Industrial Works, Sept., '05 to date.
1014 Birney St., Bay City, Mich.

William E. Post, (Marine). D'ftsman, Great Lakes Eng. Wks., Hull Dept., Detroit, Oct., '04, to Jan., '06. In charge of Boiler Testing, Jones & Laughlin Steel Co., Pittsburg, Pa., Jan., '06 to March, '06. D'ftsman, Canadian Bridge Co., Ltd., Walkerville, Ont., March, '06 to date. *376 Jefferson Ave., Detroit, Mich.*

Jesse T. Pratt, (Mechanical). Machine Designing, L. A. Pratt, '04 to date. *415 Grant Place, Bay City, Mich.*

Harris P. Ralston, A.B. (Chemical). D'ftsman, The Solvay Process Co., '04-5. Foreman of Elect. Dept. do., '05. On Switchboard Design and Construction do., Dec., '05, Feb., '06. In Eng. Dept. do., Feb., '06 to date. *835 Jefferson Ave., Detroit, Mich.*

Birtram W. Ransom, (Civil). Dftsman, Am. Bdge. Co., Toledo, '04-5. Rodman, L. S. & M. S. Ry., Toledo, '05. Dftsman, also Superintending Const., Trussed Concrete Steel Co., Detroit, '05-6. Chief Engr., W. F. Kearns & Co., '06 to date. *161 Devonshire St., Boston, Mass.*

+Lewis C. Rogers, (Mechanical). M. Detroit Eng. Soc. Testing Engr., The Solvay Process Co., '04 to date. *The Solvay Process Co., Detroit, Mich.*

Sydney R. Russel, (Mechanical). M.S. '06. Dftsman, Great Lakes Eng. Wks., '05 to date. Resident Graduate U. of M., '05-'06. *863 Jefferson Ave., Detroit, Mich.*

John W. Seens, (Civil). M. Detroit Eng. Soc. Dftsman, Canadian Bdge. Co., Walkerville, Ont., June '04 to Oct. '05. Do., City Engr., Grand Rapids, Mich., Oct. '05 to Feb. '06. Do., Canadian Bdge. Co., Feb. '06 to date. *376 Jefferson Ave., Detroit, Mich.*

William Seymour, (Chemical). Chemist, Grand Rapids Gas Light Co., '04-'06. *275 Sheldon St., Grand Rapids, Mich.*

Carl H. Smith, (Civil). State Student Sec., Y. M. C. A., '04-5. Graduate Sec., University Students' Christian Assoc., '05-6. *215 So. State St., Ann Arbor, Mich.*

Morris H. Stimson, (Mechanical). M. Univ. of Mich. Eng. Soc. Apprentice Am. Radiator Co., Detroit, '04-6. *533 Woodward Ave., Detroit, Mich.*

Walter P. Stine, (Civil). Rodman on Panama Canal, '04. Levelman, do., '04-5. Asst. Engr., Republic of Panama, '05. Chief Engr., Prov. Los Santos, do., July to Nov. '05. Chief Engr., Prov. Veraguos, do., Nov. '05 to Feb. '06. Inspector of Bridges, 3 central provinces, do., Feb. '06 to date. *Aguadulce, Republic of Panama.*

Charles R. Swineford, (Mechanical). Dftsman, Platt Iron Wks. Co., '04 to date. *568 Arcade Bldg., Dayton, O.*

+Juan F. R. Tecson, (Civil).

George G. Thompson, (Electrical). Machinist, Olds Motor Wks., '04. Asst. Power Dept.. Edison Illum'g Co., '04-5. Dftsman, F. F. Van Tuyl, '05 to date. *485 2nd Ave., Detroit, Mich.*

NAME	CLASS	PAGE
Gram, R. S.	1905	242
Grant. E. W.	1875	162
Grant, G. Jr.	1903	230
Graver, A. M.	1905	242
Graver, H. S.	1904	236
Green, A. C.	1904	236
Green, B. L.	1891	182
Green, F. M.	1898	211
Greene, A. E.	1896	201
Gregg, M. H.	1904	236
Greulich, O.	1894	191
Groesbeck, L. M.	1893	188
Grove, W. V.	1878	164
Guernsey, F. W.	1873	159
Guillotte, D. M.	1896	201
Gustin, R. P.	1895	194
Haigh, G. R.	1905	242
Hall, B. V. R.	1904	236
Hall, M. A.	1904	236
Hall, O. I.	1905	242
Hall, R. M.	1902	226
Hall, R. S.	1904	236
Halsted, J.	1887	173
Hamilton, C. H.	1869	153
Hamilton, P.	1896	201
Hammond, J. C.	1894	191
Hamper, H. D.	1894	192
Hand, W. R.	1887	173
Hanson, J. K.	1878	164
Harding, S. T.	1905	242
Harmon, C. J.	1894	192
Harrington, G. H.	1896	201
Harrington, H. E.	1898	211
Harris, A. L.	1898	212
Harris, Harmon A.	1899	216
Harris, Harry A.	1904	236
Harris, J. B.	1903	230
Harris, S. F.	1899	216
Harrison, H. T.	1897	206
Harting, H. D.	1900	219
Hartman, M. C.	1899	216
Harvey, L. R. M.	1898	212
Hatch, H. J.	1891	182
Hatch, J. N.	1892	184
Hathaway, J. E.	1881	167
Haubrick, A. M.	1895	195
Havens, M. K.	1868	152
Hayes, C. E.	1905	242
Hayes, W. B.	1890	180
Hayler, G. Jr.	1894	192
Hayward, J. A.	1870	155
Hazelton, W. S.	1902	226
Head, W. J.	1873	159
Heavenrich, M. P.	1904	237
Heffelbower, O. E.	1899	216
Hegeler, J. W.	1889	177
Hegeler, Mary, (Mrs. Paul Carus)	1882	168
Henning, C. S.	1879	166
Henninger, F. W.	1897	206
Henry, G. P.	1901	223
Hess, K. W.	1887	173
Hetzler, H. G.	1886	172
I. D.	1887	173
Hildner, L. F. W.	1893	188
Hill, A.	1865	149
Hill, C. D.	1880	167
Hill, G. S.	1901	223
Hill, L. C.	1886	172
Himes, W. H.	1903	230
Hinchman, T. H.	1893	188
Hinkson, W. J.	1891	182
Hixson, C. J.	1899	216
Hoadley, J. S.	1896	201
Hoag, S. A.	1903	230
Hodge, G. B.	1887	173
Hodge, J. E.	1888	175
Hogan, E. L.	1904	237
Hogle, W. M.	1904	237
Holcomb, A. E.	1901	223
Holdsworth, P. M.	1898	212
Holliday, J. C.	1869	153
Holmes, A.	1904	237
Holmes, H.	1874	160
Holmes, J. S. H.	1893	188
Hooker, H.	1904	237
Hookway, A. W.	1893	188
Hoover, D. E.	1881	167
Hoover, F. R.	1899	216
Hoover, J. W.	1875	162
Hopkins, F. M.	1902	226
Hornberger, W. C.	1901	223
Horner, S.	1904	237
Horth, J. L.	1899	216
Horton, B. D.	1895	195
Horton, R. F.	1901	223
House, E. B.	1896	201
Houston, W. O.	1904	237
Howard, C. W.	1903	230
Howden, H.	1893	188
Howell, C. A.	1892	185
Howie, H. B.	1905	242
Howlett, L. G.	1899	216
Hoyt, E. D.	1896	201
Hoyt, J. T. N.	1891	182
Hubbell, C. W.	1893	188
Hudnutt, G. D.	1901	223
Hughes, E. A.	1899	216
Hull, J. S.	1874	160
Hull, M. W.	1893	188
Hulst, I.	1895	195
Hunt, J. H.	1905	242
Huntoon, M. B.	1895	195
Hussey, W. J.	1889	177
Hutchins, H. C.	1903	230
Hutchinson, L.	1897	206
Imhof, H.	1902	226
Irwin, J. W.	1896	201
Ives, V. S.	1893	188
Jackson, H. B.	1874	160
Jackson, H. C.	1896	201
Jackson, R. B.	1902	226
Jackson, R. P.	1902	226
Jacobs, E. H.	1900	219
Jansky, C. M.	1905	243
Jaycox, J. M.	1887	174
Jenison, E. S.	1868	152
Johnson, A.	1866	150

NAME	CLASS	PAGE
Johnson, C.	1904	237
Johnson, H. F.	1902	226
Johnson, J. B.	1878	164
Johnston, C. T.	1895	195
Johnston, E. S.	1868	152
Johnston, L. F.	1900	219
Johnstone, W. M.	1892	185
Jones, C. D.	1893	188
Jones, C. R.	1905	243
Josenhans, T.	1878	164
Joseph, O. G.	1900	220
Judd, H. W.	1878	164
Judson, L. P.	1867	151
Kahn, J.	1896	201
Kalmbach, A. L.	1896	201
Kastl, A. E.	1885	170
Keating, W. T.	1891	182
Keeler, F. L.	1893	188
Keeney, H. B.	1903	231
Keller, C. L.	1904	237
Kelly, H. B.	1896	201
Kempf, J. R.	1890	180
Keyes, J. P.	1892	185
Khuen, R. Jr.	1889	177
Kiefer, E. W.	1901	223
Kiehle, J. W.	1903	231
Kimball, D. W.	1905	243
Kimmel, W. L.	1899	216
King, B. D.	1879	166
King, H. R.	1894	192
King, H. W.	1895	195
King, W. C.	1886	172
Kingsbury, S. B.	1904	237
Kinne, E. P.	1002	227
Kintner, C. J.	1870	155
Kirschbraun, L.	1904	237
Kittleman, W. W. Jr.	1901	223
Kittredge, C.	1897	206
Kletzer, W.	1905	243
Klotz, O. J.	1872	158
Kneip, W. F.	1904	237
Knight, A. H.	1900	220
Knight, E. K.	1903	231
Knight, H. V.	1905	195
Knox, S. K.	1903	231
Krause, F.	1860	147
Krause, O. A.	1900	220
Kremers, R. E.	1900	220
Kusterer, A. E.	1905	243
La Fever, C. A.	1899	217
Lafler, W. A.	1903	231
Lake, G. B.	1869	153
Lamont, G. T.	1896	202
Lamont, R. P.	1891	182
Lancashire, F. H.	1902	227
Lane, C. H.	1885	171
Lane, V. H.	1874	160
Larrabee, W. B.	1892	185
Lathrop, D. W.	1905	243
Lederle, G. A.	1881	167
Lee, T. B.	1896	202
Leefe, F. E.	1901	224
Leeson, C. G.	1901	224
Le Favour, D.	1895	195
Lehnartz, W.	1900	220
Leland, O. M.	1900	220
Leonard, H. B.	1895	195
Lewen, R.	1905	243
Lodewyck, A. G.	1903	231
Lewis, H.	1904	237
Lewis, H. W.	1866	150
Lewis, J. A.	1888	175
Lewis, J. G.	1897	206
Lichtenstein, M.	1894	192
Lilly, G. W.	1881	167
Linabury, J. E.	1902	227
Lindau, A. E.	1900	220
Liskow, B. H.	1901	224
Littlefield, J. L.	1871	156
Livingstone, W. A.	1889	177
Lodewyck, A. C.	1903	231
Loeffler, E. T.	1886	171
Loomis, C. B.	1900	220
Louckes, F. I.	1903	231
Loud, F. H.	1900	220
Lunn, E.	1899	217
Lunn, G. W.	1900	220
Loughnane, G.	1887	174
Loveridge, F. H.	1889	177
Lungren, C. M.	1874	160
Luten, D. B.	1894	192
Lyman, R. R.	1895	196
Lyon, E. D.	1897	206
Lyster, T. L. B.	1901	224
McAfee, J. E.	1904	238
McAllaster, E. L.	1889	177
McBain, W. C.	1904	238
McCloy, R. R.	1902	227
McColl, T. D.	1896	202
McCrickett, T. F.	1897	206
MacDonald, A. T.	1905	243
McDonald, B.	1886	172
McDonnell, H. E.	1904	238
McDougall, A. H.	1901	224
McEwan, W. H.	1882	168
McGee, G. T.	1896	202
MacGregor, W.	1901	224
McHarg, W. S.	1868	152
McKee, W. M.	1899	217
McKenzie, D.	1865	149
McLean, F. M.	1904	238
McLean, H. A.	1900	221
McMullen, G. K.	1896	202
McMullen, R. W.	1905	243
MacNaughton, G. D.	1901	224
McNeil, M. C.	1902	227
Mahon, R. L'H.	1888	175
Mann, E. G.	1878	164
Manning, R. G.	1890	180
Mansfield, J. R.	1904	238
Mansfield, R. J.	1900	221
Marquardt, C. R.	1896	202
Marr, G. A.	1863	148
Marsh, D. E.	1903	231
Marsh, E. P.	1898	212
Marsh, H. S.	1900	221
Marsh, W. J.	1898	212
Marshall, A. C.	1893	188

NAME	CLASS	PAGE
Marshall, C. A.	1876	163
Martin, P. W.	1902	227
Martin, W. F.	1897	206
Mason, C. S.	1896	202
Mason, L.	1871	156
Matthews, W. J.	1904	238
Mathewson, T. K.	1895	196
Matsuyama, S.	1900	221
Maurice, W. B.	1900	221
May, E. S. C.	1890	180
May, W. B.	1904	238
Mayworm, A. J.	1899	217
Mead, E. B.	1900	221
Mead, O. F.	1904	238
Meese, W. H.	1905	243
Melchers, W. J.	1895	196
Mendenhall, W.	1863	148
Merrick, H. B.	1898	212
Merrick, H. G.	1905	243
Merrill, H. W.	1896	202
Merrill, R. H.	1902	227
Meyendorf, M. A.	1870	155
Mickle, G. W.	1870	155
Miggett, W. L.	1899	217
Milburn, H. M.	1903	231
Miller, G. H.	1893	189
Miller, H. W. Jr.	1905	243
Miller, W. C.	1881	167
Miller, W. C.	1900	221
Mills, H. Y.	1896	202
Miner, C. A.	1895	196
Minto, W.	1860	147
Mitchell, J. A.	1872	158
Montague, H. H.	1904	238
Montgomery, J. H.	1897	206
Moody, H. A.	1898	212
Moore, H. E.	1897	206
Morehouse, L. F.	1897	207
Morgan, W. B.	1863	148
Moritz, C. J. H.	1897	207
Morley, F.	1886	172
Morley, H. T.	1879	166
Morley, W. R.	1903	231
Morrison, J. H.	1875	162
Morse, C. H. Jr.	1895	196
Morse, S. T.	1878	165
Morsman, J. J.	1893	189
Morton, R. H.	1903	231
Moses, I. C.	1887	174
Moses, W. V.	1889	177
Mott, A. D.	1892	185
Mountain, I. T.	1899	217
Muir, W. H.	1888	175
Mundt, W. C.	1904	238
Murphy, E. J.	1891	182
Mustard, J. H.	1904	238
Myers, R. M.	1901	224
Neff, E. H.	1890	180
Nelson, J. B.	1890	181
Nelles, F. N.	1900	221
Newell, A. C.	1892	185
Newell, F. W.	1898	212
Neumann, W. F. V.	1897	207
Newton, A. L.	1901	224
Newton, C. G.	1898	212
Newton, G. D.	1896	202
Newton, L. L.	1896	203
Newton, M. L.	1875	162
Newton, R. E.	1898	212
Newton, R. W.	1894	192
Nichols, J. F.	1895	196
Nichols, M. C.	1905	243
Nicholson, E.	1895	196
Noble, A.	1870	155
Noble, C. W.	1899	217
Noble, F. C.	1894	192
North, W. B.	1905	243
Norton, A. W.	1900	221
O'Brien, A. P.	1896	203
O'Brien, W. K.	1896	203
Olson, H. E.	1905	243
Olson, O. E.	1904	238
Otis, H. B.	1896	203
Otis, R. B.	1903	231
Ovitz, F. K.	1905	243
Owen, C. F.	1878	165
Paddock, L. A.	1904	238
Page, F. J.	1900	221
Page, V. L.	1903	231
Palmer, C. G.	1896	203
Palmer, R. K.	1894	192
Pantlind, G. E.	1875	162
Parker, J. C.	1901	224
Parker, Marian S.	1895	197
Parker, R. D.	1905	243
Parker, W. P.	1894	192
Parker, W. R.	1888	175
Parks, J. A.	1905	244
Parmenter, F. S.	1903	231
Parrott, L. M.	1896	203
Parshall, A. J.	1871	156
Parsons, E. I.	1875	162
Passolt, A. S.	1895	197
Payne, I. W.	1883	169
Pearson, W. L.	1905	244
Pease, W. H.	1888	175
Peck, C. F.	1905	244
Pelham, F. B.	1887	174
Pennington, B. H.	1871	156
Perkins, E. F.	1905	244
Perkins, J. W.	1873	159
Perrien, J.	1897	207
Perry, C. H.	1895	197
Perry, E. B.	1880	178
Perry, E. D.	1871	156
Perry, T. O.	1872	158
Perry, W. B.	1904	238
Pettersch, J. H.	1898	212
Philbrick, P. H.	1868	152
Pierce, M.	1903	232
Polglase, D. E.	1903	232
Pomeroy, L. S.	1893	189
Pond, I. K.	1879	166
Poore, C.	1868	152
Pope, W.	1888	175
Porter, M. E.	1893	189
Post, W. E.	1904	239
Potter E. F.	1903	232

NAME	CLASS	PAGE
Potter, W. H.	1875	162
Pratt, C.	1871	156
Pratt, G. C.	1897	207
Pratt, J. T.	1004	239
Pratt, K. H.	1903	232
Pruessman, A.	1902	227
Pruessman, O.	1898	212
Prout, H. G.	1871	157
Purcell, F. C.	1903	232
Quinn, R.	1894	193
Quintus, J. C.	1879	166
Rademacher, F. M.	1903	232
Rademacher, H. A.	1903	232
Radford, W. H.	1903	232
Raikes, J. M.	1896	203
Ralston, H. P.	1904	239
Rannells, C. J.	1900	221
Ranson, B. W.	1904	239
Ravenscroft, E. H.	1898	213
Raymond, A. B.	1871	157
Raymond, H. M.	1893	189
Raynor, C. W.	1898	213
Rebstock, A. M.	1905	244
Reeves, R. J.	1868	152
Reibling, W. C.	1905	244
Reid, E. S.	1893	189
Remington, J. W.	1866	150
Rhodes, D. H.	1869	153
Rich, B. C.	1896	203
Rich, E. P.	1903	232
Richards, B. C.	1877	164
Richardson, A. E.	1899	217
Richardson, A. H.	1901	224
Richardson, P. H.	1888	175
Richardson, R. D.	1905	244
Richmond, F. S.	1891	182
Ripley, H. C.	1870	156
Ripley, J.	1876	163
Rippey, W. H.	1897	207
Rising, W. R.	1867	151
Robbins, W.	1896	203
Roberts, F. C.	1897	207
Roberts, O.	1894	193
Roberts, S. E.	1895	197
Roberts, W.	1899	217
Robinson, A. A.	1869	153
Robinson, S. W.	1863	148
Rodman, H.	1893	189
Roehl, C. E.	1888	175
Roehm, G. E.	1887	174
Rogers, F. A.	1894	193
Rogers, L. C.	1904	239
Rohnert, B.	1887	174
Roosevelt, R. M.	1902	227
Root, E. D.	1875	162
Rosen, D. N.	1899	217
Rosencrans, E. J.	1893	189
Rosing, A. S.	1900	221
Ross, J.	1003	232
Rounds, W. P.	1889	178
Rowe, G. H.	1891	182
Rummler, E. A.	1901	225
Rumsey, I. L.	1874	160
Runge, R. W.	1900	221
Runner, M. L.	1903	232
Rusche, J. P.	1888	175
Russel, S. R.	1904	239
Russel, W. S.	1875	162
Russell, H. L.	1898	213
Ryan, E.	1888	176
Ryan, E. J.	1896	203
Ryan, W. R.	1903	232
Sabin, L. C.	1890	181
Sack, R. E.	1896	203
Sackett, H. M.	1889	178
Sackett, R. L.	1891	183
Sager, F. A.	1894	193
St. Clair, J. T.	1898	213
St. John, A. G.	1899	217
St. John, E. M.	1895	197
St. John, H. L.	1903	232
Salter, W. G.	1895	197
Samuel, G. F.	1885	171
Sanders, J. D.	1876	163
Sanderson, J.	1878	165
Satterlee, F. P.	1880	167
Savage, F. N.	1898	213
Schaake, W.	1895	197
Schaeberle, E. A.	1903	233
Schaeberle, J. M.	1876	163
Schairer, O. S.	1902	227
Schneck, E.	1905	244
Schober, M. R.	1905	244
Schuett, A. H.	1903	233
Scott, E.	1895	197
Seabolt, F. J.	1807	207
Seas, L. E.	1901	225
Sedgwick, H. W.	1900	221
Seeley, T. J.	1869	153
Seens, J. W.	1904	239
Seery, R. C.	1903	233
Seymour, G. H.	1861	148
Seymour, W.	1904	239
Seymour, W. W.	1892	185
Shankland, R. M.	1888	176
Shaw, L.	1901	225
Shaw, W. D.	1902	228
Shenk, F. D.	1903	233
Shepard, J. C.	1876	163
Shoemaker, L. H.	1889	178
Shotwell, J. W.	1888	176
Simonds, C. G.	1897	208
Simonds, O. C.	1878	165
Simpson, G. R.	1886	172
Sims, S.	1903	233
Sinclair, J. A.	1887	174
Sizer, F. L.	1878	165
Skinner, F. G.	1895	197
Small, W.	1897	208
Smith, A. H.	1892	185
Smith, C. C.	1871	157
Smith, C. C.	1886	173
Smith, C. H.	1904	239
Smith, D. D.	1905	244
Smith, E. M.	1892	185
Smith, F. C.	1889	178
Smith, F. M.	1868	152
Smith, J. F.	1905	244

NAME	CLASS	PAGE
Smith, L. B.	1898	213
Smith, W. C.	1905	244
Smith, W. S.	1894	193
Snover, C. M. C.	1866	150
Snover, E. J.	1877	164
Soper, F. C.	1896	203
Spalding, E. M.	1872	158
Spence, D. W.	1891	183
Spencer, C. H.	1896	203
Sprague, E. M.	1888	176
Springer, G. B.	1890	181
Sproat, H. J.	1901	225
Squier, C. W.	1898	213
Standish, S. H.	1905	244
Stanley, L. A.	1895	197
Stannard, G E.	1889	178
Starr, D. D.	1902	228
Starrett, G.	1894	193
Stebbins, W. T.	1896	203
Steck, E.	1901	225
Steck, R.	1898	213
Steel, J.	1867	151
Steen, I. F.	1895	198
Stenger, E.	1886	173
Sterrett, D. J.	1905	244
Stevens, C. M.	1873	159
Stevens, F. C.	1903	233
Stevens, R. C.	1895	198
Stevenson, A. D.	1896	203
Stimson, M. H.	1904	239
Stine, W. P.	1904	239
Stokoe, J.	1905	244
Stow, R. A.	1905	244
Strawn, L. H.	1876	163
Streib, J. F.	1898	213
Streng, J. C.	1884	170
Stroebe, E. C.	1902	228
Struckman, E. G.	1897	208
Stull, H. J.	1888	176
Stull, O. S.	1889	178
Swan, F. V. V.	1896	203
Swartout, W. C.	1902	228
Swift, L.	1869	154
Swineford, C. R.	1904	239
Taft, M. C.	1889	178
Taggart, J. M.	1903	233
Tagge, A. C.	1897	208
Talman, W. W.	1901	225
Tanner, G. W.	1896	203
Tate, W. C.	1895	198
Taylor, W. W.	1893	189
Tecson, J. T. R.	1904	239
Teed, D. E.	1905	244
Tefft, L. J.	1903	233
Temple, F. R.	1905	244
Temple, M. F.	1872	158
Temple, W. F.	1903	233
Terrell, C. D.	1899	218
Terry, H. E.	1878	165
Thomas, C. H.	1898	213
Thompson, A.	1867	151
Thompson, G. G.	1904	239
Thompson, W. H.	1896	203
Thomson, R. R.	1904	240
Tinkham, R. R.	1905	245
Towler, R. H.	1905	245
Tracy, W. W.	1905	245
Traver, A. F.	1900	221
Treadway, H. P.	1898	214
Treadwell, E.	1869	154
Trevidick, M. S.	1897	208
Trott, F.	1899	218
Tryon, C. J.	1905	245
Tschirgi, M. Jr.	1872	158
Tubbs, N. J.	1895	198
Tullock, A. J.	1876	163
Turtle, J. E.	1877	164
Tuthill, G. C.	1891	183
Tuthill, J.	1883	169
Tyler, J. S.	1904	240
Udell, L. N.	1902	228
Unsold, A. G.	1897	208
Unthank, A. W.	1865	149
Upmeyer, C. H.	1905	245
Utley, J. A.	1903	233
Vail, R. A.	1904	240
Vandersluis, W. M.	1902	228
Van Deventer, H. F.	1892	186
Van Pelt, E.	1878	165
Van Pelt, S.	1898	214
Van Splunter, J. M.	1904	240
Van Tuyl, F. F.	1895	198
Vaughan, C. H.	1896	203
Vickers, F. E.	1897	208
Visscher, O. W.	1904	240
Vlademiroff, T.	1897	208
Voight, W. Jr.	1873	159
Wagner, F. C.	1885	171
Wahl, F. G.	1905	245
Waite, D. C.	1904	240
Walbridge, E. E.	1888	176
Walker, G. M.	1891	183
Walker, I. O.	1883	169
Walker, S. W.	1871	157
Walker, W. T. Jr.	1904	240
Walser, J. J.	1900	222
Walther, O. C.	1904	240
Walton, E. N.	1904	240
Waring, C. A.	1904	240
Waters, C. M.	1900	222
Waters, W. J.	1870	156
Watson, H. G.	1905	245
Weare, G. C.	1894	193
Weare, H. C.	1896	204
Weare, J.	1894	193
Webb, J. B.	1871	157
Webber A. A.	1898	214
Weber, O. L. E.	1893	189
Webster C. D.	1897	209
Webster, D. B.	1905	245
Webster, D. W.	1903	233
Weideman, C. H.	1899	218
Weidman, W. R.	1899	218
Weiland, E. A.	1904	240
Weiskopf, S. C.	1882	168
Welch, R. A.	1905	245
Wells, E. J.	1862	148
Wells, M. J.	1875	163

NAME	CLASS	PAGE
Wells, M. N.	1868	152
Wenzell, A. J.	1878	165
Wetmore E. P.	1887	174
Wetmore, J. McM.	1901	225
Wheeler, A. C.	1903	233
Wheeler, E. S.	1867	151
Wheeler, L. L.	1874	160
Wheeler, L. L.	1896	204
Wheeler, O. B.	1862	148
Wherry, H. P.	1903	233
Whitaker, H. E.	1888	176
White, A. H.	1904	240
White, D. A.	1905	245
Whiting, J.	1869	154
Whiting, J. A.	1904	240
Whitlark, L. C.	1905	245
Whitman, F. S.	1896	204
Whitman, P. R.	1889	178
Whitmore, J. D.	1905	245
Whitney, C. W.	1899	218
Whitsit, L. A.	1905	245
Wickes, E. D.	1893	190
Wight, S. B.	1878	165
Wilber, B. D.	1899	218
Wilber, F. J.	1900	222
Wiley, R. R.	1897	209
Wilkins, V. P.	1895	198
Wilkinson, T. L.	1891	183
Willcox, G. B.	1895	198
Williams, B.	1869	154
Williams, C. B.	1896	204
Williams, G. S.	1889	179
Williams, H. J.	1888	176
Williams, N. H.	1893	190
Williams, R. E.	1874	160
Willis, J. W.	1873	159
Williston, C. A.	1904	241
Willits, W. C.	1870	156
Willoughby, V. R.	1896	204
Wills, W. L.	1903	233
Wilson, F. C.	1902	228
Wilson, O. S.	1874	160
Wilson, S.	1905	245
Wilson, W. K.	1905	245
Winchell, C. M.	1873	159
Windes, F. A.	1893	190
Wines, L. D.	1874	160
Wisner, G. M.	1892	186
Wisner; G. Y.	1865	149
Wolverton, I. M.	1890	181
Wood, A. B.	1899	218
Wood, A. P.	1866	150
Wood, E. F.	1879	166
Wood, F. J.	1902	228
Wood, J. W.	1861	148
Wood, J. W.	1900	222
Wood, M. A.	1898	214
Wood, V. C.	1904	241
Woodard, L. A.	1896	204
Woodard, S. H.	1896	204
Woodmansee, F.	1898	214
Woodruff, E. F.	1896	204
Woods, G. H.	1896	204
Woods, W. H.	1897	209
Woodward, I. C.	1897	209
Woodward, R. S.	1872	159
Woolfenden, H. L.	1896	204
Woolfenden, J. J.	1905	245
Wrentmore, C. G.	1893	190
Wright, J. C.	1904	241
Wuerfel, G. D.	1900	222
Wyckoff, F. A.	1903	233
Wyckoff, H. W.	1895	198
Yokom, A. E.	1904	241
York, B. S.	1901	225
Young, C. E.	1901	225
Young, J. G.	1900	222
Young, J. H.	1905	245
Zealand, T. F. H.	1901	225
Zelner, O. S.	1905	245

General Index

- Absent with Excuse, Removel of Record, 70.
- Absent without Excuse, Removal of Record, 70.
- Academic Year, 17.
- Admission:
  - As Graduate Students, 26.
  - As Special Students, 27.
  - By Examination, 20.
  - Conditional, 22, 69.
  - Conditions, Rules Concerning, 69.
  - Examinations for, 22.
  - Examinations, Schedule of, 23.
  - From Department of Literature, Science, and the Arts, 19.
  - On Credits from Another College, 24.
  - On Diploma, 18.
  - Requirements for 1906-1907, 17.
  - To Advanced Standing, 24.
- Advanced Credit—See Advanced Standing.
- Advanced Projections (Drawing 6):
  - Course offered in, 87.
  - Requirement for Graduation, 112.
  - Schedule of, 101.
- Advanced Projections and Stereotomy (Drawing 5):
  - Course offered in, 87.
  - Requirement for Graduation, 111, 114.
  - Schedule of, 99, 103, 104, 106.
- Advanced Standing:
  - Admission to, 24.
- Algebra, Requirement for Admission, 32.
- Algebra (Mathematics 1):
  - Course offered in, 78.
  - Description of Work in, 40.
  - Requirement for Graduation, 111-114.
  - Schedule of, 98.
- Alternating Current Generators (Elect. Engineering 3):
  - Course offered in, 93.
  - Description of Work in, 51.
  - Requirement for Graduation, 112.
  - Schedule of, 101, 108.
- Alternating Current Motors (Elect. Engineering 4):
  - Course offered in, 94.
  - Description of Work in, 51.
  - Requirement for Graduation, 112.
  - Schedule of, 101, 108.
- Alumni, Alphabetical Index of, 247.
- Alumni Association, Officers of, 145.
- Alumni, Register of, 147.
- Analytic Geometry (Mathematics 1 and 2):
  - Courses offered in, 78.
  - Requirement for Graduation, 111-114.
  - Schedule of, 98.
  - Announcements for 1906-1907, 4.
  - Approved Schools, 18.
- Architecture:
  - Courses offered in, 95, 96, 97.
  - Description of Work in, 54.
  - Requirement for Graduation (1, 2, 4-8, 11-14, 17-19, 21-24), 114.
  - Schedule of (Courses 1, 2, 4-8, 11-14, 17-19, 21-24), 103, 104.
- Architectural Engineering:
  - Courses offered in, 95, 96, 97.
  - Description of Work in, 54.
  - Requirement for Graduation (1, 2, 4, 5, 9-14, 21, 22, 24), 114.
  - Schedule of (Courses 1, 2, 4, 5, 9-14, 21, 22, 24), 104, 105.
- Astronomical Observatory, 64.
- Astronomy:
  - Courses offered in, 84.
  - Description of Work in, 42.
- Athletic Field—See Facilities for Physical Culture, 67.
- Bachelor of Science, Degree of, 110.
- Board, Cost of, 29.
- Board of Regents, 6.
- Botany, Requirement for Admission, 34.
- Calculus (Mathematics 3, 4, 5, 6):
  - Courses offered in, 78.
  - Description of Work in, 40.
  - Requirement for Graduation, 111-114.
  - Schedule of, 99-104, 106-109.
- Calendar:
  - For 1906-1907, 5.
  - University of Michigan, 15.
- Carpenter and Pattern Shop, 59.
- Certificates:
  - From Approved Schools, 18.
  - From Other Schools, 19.
  - From Regents of the University of the State of New York, 18.
- Chemical Engineer, Degree of, 115.
- Chemical Engineering:
  - Courses offered in, 80, 94.
  - Description of Work in, 16, 41, 52.
  - Requirements for Graduation, 111-114.
  - Chemical Laboratories, 57.

Chemical Technology (Chemistry 33, 39):
  Courses offered in, 81, 83.
  Requirement for Graduation, 112.
  Schedule of, 102, 108, 109.
Chemistry:
  Courses offered in, 80-83.
  Description of Work in, 41.
  Entrance deficiency in, 80, 98.
  Requirement for Admission, 33.
  Requirements for Graduation (Courses 2E, 3*a*, 3*b*, 5, 7, 28, 33, 35, 38, 39), 111-114.
  Schedule of (Courses 2E, 3*a*, 3*b*, 5, 7, 28, 33, 35, 38, 39), 98-103.
Choral Union—See University Organizations, 66.
Civil Authorities, Relation of Students to, 37.
Civil Engineer, Degree of, 115.
Civil Engineering:
  Courses offered in, 89, 90, 91.
  Description of Work in, 46, 47.
  Requirement for Graduation (Courses 1, 2, 3, 4, 5, 6, 7), 111-114.
  Schedule of (Courses 1, 2, 3, 4, 5, 6, 7), 99-109.
Civil Government, Requirement for Admission, 33.
Classification of Students, 4, 68.
Commencement, Date of, 4.
Compressed Air and Refrigeration, (Mech. Engineering 14):
  Course offered in, 92.
  Description of Work in, 50.
Conditional Admission, 22, 69.
Conditionally Passed, Removal of Record of, 70.
Conditions:
  Removal of Entrance, 20.
  Rules Relating to, 69, 70.
Courses Announced for 1906-1907, 71.
  Courses of Instruction, 67.
Credit:
  For Advanced Standing, 26.
  For Work done outside of University, 68.
  Hour of, 67.
  To receive, 69.
Deficiencies, How removed, 69, 70, 71.
Deficiency:
  In Chemistry (Entrance), 80, 98.
  In Trigonometry (Entrance), 78, 98.
Degree of:
  Bachelor of Science, 110.
  Master of Science, 115.
  Civil Engineer, Mechanical Engineer, Electrical Engineer, Chemical Engineer, Naval Architect, Architect, Marine Engineer, Architectural Engineer,
Department of Literature, Science, and the Arts, Admission from, 19.
Descriptive Geometry (Drawing 4):
  Course offered in, 87.
  Requirement for Graduation, 111-114.
  Schedule of, 98.
Design of Electrical Machinery (Elect. Engineering 5):
  Course offered in, 93.
  Description of Work in, 51.
  Requirement for Graduation, 112.
  Schedule of, 101, 108.
Diploma:
  Admission on, 18.
Direct Current Machinery (Elect. Engineering 2):
  Course offered in, 94.
  Description of Work in, 51.
  Requirement for Graduation, 112.
  Schedule of, 101, 108.
Directions and Suggestions, 36.
Dismissal, Honorable, 37.
Distribution of Electricity (Elect. Engineering 12):
  Course offered in, 94.
  Description of Work in, 51.
  Requirement for Graduation, 112.
  Schedule of, 101, 108.
Drawing:
  Courses offered in, 87, 89-97.
  Description of Work in, 42, 54.
  Requirement for Admission (Allowed), 21, 22, 35.
  Requirement for Graduation (Courses 4, 5, 6, 21, 22, 23, 24, 25), 111-114.
  Schedule of (Courses 4, 5, 6, 21, 22, 23, 24, 25), 98, 99, 101, 103-105.
Dynamo Elect. Machinery (Elect. Engineering 1):
  Course offered in, 93.
  Description of Work in, 51.
  Requirement for Graduation, 111-114.
  Schedule of, 99, 100, 102-104.
Election of Studies:
  By Literary Students, 25, 68.
  Rules for, 68.
Elective Courses in Department of Literature, Science, and the Arts, 68.
Electric Generation Stations (Elect. Engineering 11):
  Course offered in, 93.
  Requirement for Graduation, 112.
  Schedule of, 101, 108.
Electric Railways (Elect. Engineering 8):
  Course offered in, 94.
  Requirement for Graduation, 112.
  Schedule of, 101, 108.
Electrical Engineer, Degree of, 115.

Electrical Engineering:
  Courses offered in, 93, 94.
  Description of Work in, 50, 52.
  Requirement for Graduation (Courses 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14), 111-114.
  Schedule of (Courses 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14), 99-104.
Electrical Engineering Laboratory, 62.
Electrical Measurements (Physics 5, 12):
  Courses offered in, 79, 80.
  Description of Work in, 50.
  Requirements for Graduation, 112.
  Schedule of, 101, 108.
Electricity (Physics 2E)—See Heat, Electricity, and Magnetism.
Employment for Students, 36.
Engineering Constructions (Civil Engineering 4):
  Course offered in, 90.
  Requirement for Graduation, 111, 114.
  Schedule of, 99, 105, 106.
Engineering Laboratory:
  Mechanical, 60.
  Electrical, 62.
  Chemical, 57.
  Marine, 63.
Engineering Library, 64.
Engineering Shops, 59.
Engineering Society, 65.
English:
  Courses offered in, 71, 72.
  Description of Work in, 38, 39.
  Requirement for Admission, 21, 30, 31.
  Requirement for Graduation (Course 1), 111-114.
  Schedule of (Course 1), 98.
Examinations:
  Admission, 22.
  Excuse from, 70.
  Given Without Notice, 69.
  Rules Relating to, 69.
  Schedule of Admission, 23.
  Schedule of Term, 116.
  Special Fee for, 22.
  Supplementary, 70.
Examining Board, 20.
Expenses:
  Annual, 29.
  See Fees, 28.
Experimental Tank, 63.
Experimental Tank Work, 54.
Extra Hours, Election of, 69.
Facilities for Instruction, 56.
Faculty, Members of, 7.
Fees:
  Absentia (for Students Studying in), 28.
  Annual, 28.
  Graduation, 28.
  Laboratory, 28.
  Matriculation, 27.
  Refunding of, 28.
  Special Examination, 28.
  Summer Session, 66.
Fellowship in Gas Engineering, 35.
Ferry Athletic Field—See Facilities for Physical Culture, 67.
Field Work in Camp (Surveying 3):
  Course offered in, 89.
  Description of Work in, 44, 45, 46.
  Requirement for Graduation, 112, 113.
  Schedule of, 100-103, 108.
Forge Shop, 59.
Forging:
  Requirement for Admission (Allowed), 21, 22, 35.
  See Woodwork, Pattern-making, Foundry, Etc.
Foundry:
  See Woodwork, Pattern-making, Foundry, Etc.
  See Patern-making, Foundry and Machine Shop.
French:
  Courses offered in, 73, 74.
  Description of Work in, 39.
  Requirement for Admission, 21, 33.
  Requirement for Graduation (Courses 1, 2, 3, 4), 111-114.
  Schedule of (Courses 1, 2, 3, 4), 98-104.
Gas Analysis, Technical (Chemistry 35):
  Courses offered in, 81, 82.
  Requirement for Graduation, 112.
  Schedule of, 102, 109.
Gas Engineering, Fellowship in, 35.
Gas Engines (Mech. Engineering 11):
  Course offered in, 91.
  Description of Work in, 50.
Gas Fellowship—See Fellowship in Gas Engineering, 35.
General Library, 64.
Geodesy (Surveying 7):
  Course offered in, 89
  Description of Work in, 46.
Geological Laboratory, 64.
Geology:
  Courses offered in, 86.
  Description of Work in, 42.
  Requirement for Graduation, (Course 6), 111-114.
  Schedule of (Course 6), 99, 104, 105, 106.
Geometry:
  Requirement for Admission, 32.
  See Analytic Geometry.

NAME	CLASS	PAGE
Gram, R. S.	1905	242
Grant. E. W.	1875	162
Grant, G. Jr.	1903	230
Graver, A. M.	1905	242
Graver, H. S.	1904	236
Green, A. C.	1904	236
Green, B. L.	1891	182
Green, F. M.	1898	211
Greene, A. E.	1896	201
Gregg, M. H.	1904	236
Greulich, O.	1894	191
Groesbeck, L. M.	1893	188
Grove, W. V.	1878	164
Guernsey, F. W.	1873	159
Guillotte, D. M.	1896	201
Gustin, R. P.	1895	194
Haigh, G. R.	1905	242
Hall, B. V. R.	1904	236
Hall, M. A.	1904	236
Hall, O. I.	1905	242
Hall, R. M.	1902	226
Hall, R. S.	1904	236
Halsted, J.	1887	173
Hamilton, C. H.	1869	153
Hamilton, P.	1896	201
Hammond, J. C.	1894	191
Hamper, H. D.	1894	192
Hand, W. R.	1887	173
Hanson, J. K.	1878	164
Harding, S. T.	1905	242
Harmon, C. J.	1894	192
Harrington, G. H.	1896	201
Harrington, H. E.	1808	211
Harris, A. L.	1898	212
Harris, Harmon A.	1899	216
Harris, Harry A.	1904	236
Harris, J. B.	1903	230
Harris, S. F.	1899	216
Harrison, H. T.	1897	206
Harting, H. D.	1900	219
Hartman, M. C.	1899	216
Harvey, L. R. M.	1898	212
Hatch, H. I.	1891	182
Hatch, J. N.	1892	184
Hathaway, J. E.	1881	167
Haubrick, A. M.	1895	195
Havens, M. K.	1868	152
Hayes, C. E.	1905	242
Hayes, W. B.	1890	180
Hayler, G. Jr.	1894	192
Hayward, J. A.	1870	155
Hazelton, W. S.	1902	226
Head, W. J.	1873	159
Heavenrich, M. P.	1904	237
Heffelbower, O. E.	1899	216
Hegeler, J. W.	1889	177
Hegeler, Mary, (Mrs. Paul Carus)	1882	168
Henning, C. S.	1879	166
Henninger, F. W.	1897	206
Henry, G. P.	1901	223
Hess, K. W.	1887	173
Hetzler, H. G.	1886	172
Hibbard, I. D.	1887	173

NAME	CLASS	PAGE
Hildner, L. F. W.	1893	188
Hill, A.	1865	149
Hill, C. D.	1880	167
Hill, G. S.	1901	223
Hill, L. C.	1886	172
Himes, W. H.	1903	230
Hinchman, T. H.	1893	188
Hinkson, W. J.	1891	182
Hixson, C. J.	1899	216
Hoadley, J. S.	1896	201
Hoag, S. A.	1903	230
Hodge, G. B.	1887	173
Hodge, J. E.	1888	175
Hogan, E. L.	1904	237
Hogle, W. M.	1904	237
Holcomb, A. E.	1901	223
Holdsworth, P. M.	1898	212
Holliday, J. C.	1869	153
Holmes, A.	1904	237
Holmes, H.	1874	160
Holmes, J. S. H.	1893	188
Hooker, H.	1904	237
Hookway, A. W.	1893	188
Hoover, D. E.	1881	167
Hoover, F. R.	1899	216
Hoover, J. W.	1875	162
Hopkins, F. M.	1902	226
Hornberger, W. C.	1901	223
Horner, S.	1904	237
Horth, J. L.	1899	216
Horton, B. D.	1895	195
Horton, R. F.	1901	223
House, E. B.	1896	201
Houston, W. O.	1904	237
Howard, C. W.	1903	230
Howden, H.	1893	188
Howell, C. A.	1892	185
Howie, H. B.	1905	242
Howlett, L. G.	1899	216
Hoyt, E. D.	1896	201
Hoyt, J. T. N.	1891	182
Hubbell, C. W.	1893	188
Hudnutt, G. D.	1901	223
Hughes, E. A.	1899	216
Hull, J. S.	1874	160
Hull, M. W.	1893	188
Hulst, J.	1895	195
Hunt, J. H.	1905	242
Huntoon, M. B.	1895	195
Hussey, W. J.	1889	177
Hutchins, H. C.	1903	230
Hutchinson, L.	1897	206
Imhof, H.	1902	226
Irwin, J. W.	1896	201
Ives, V. S.	1893	188
Jackson, H. B.	1874	160
Jackson, H. C.	1896	201
Jackson, R. B.	1902	226
Jackson, R. P.	1902	226
Jacobs, E. H.	1900	219
Jansky, C. M.	1905	243
Jaycox, J. M.	1887	174
Jenison, E. S.	1868	152
Johnson, A.	1866	150

NAME	CLASS	PAGE
Johnson, C.	1904	237
Johnson, H. F.	1902	226
Johnson, J. B.	1878	164
Johnston, C. T.	1895	195
Johnston, E. S.	1868	152
Johnston, L. F.	1900	219
Johnstone, W. M.	1892	185
Jones, C. D.	1893	188
Jones, C. R.	1905	243
Josenhans, T.	1878	164
Joseph, O. G.	1900	220
Judd, H. W.	1878	164
Judson, L. P.	1867	151
Kahn, J.	1896	201
Kalmbach, A. L.	1896	201
Kastl, A. E.	1885	170
Keating, W. T.	1891	182
Keeler, F. L.	1893	188
Keeney, H. B.	1903	231
Keller, C. L.	1904	237
Kelly, H. B.	1896	201
Kempf, J. R.	1890	180
Keyes, J. P.	1892	185
Khuen, R. Jr.	1889	177
Kiefer, E. W.	1901	223
Kiehle, J. W.	1903	231
Kimball, D. W.	1905	243
Kimmel, W. L.	1899	216
King, B. D.	1879	166
King, H. R.	1894	192
King, H. W.	1895	195
King, W. C.	1886	172
Kingsbury, S. B.	1904	237
Kinne, E. P.	1902	227
Kintner, C. J.	1870	155
Kirschbraun, L.	1904	237
Kittleman, W. W. Jr.	1901	223
Kittredge, C.	1897	206
Kletzer, W.	1905	243
Klotz, O. J.	1872	158
Kneip, W. F.	1904	237
Knight, A. H.	1900	220
Knight, E. K.	1903	231
Knight, H. V.	1905	195
Knox, S. K.	1903	231
Krause, F.	1860	147
Krause, O. A.	1900	220
Kremers, R. E.	1900	220
Kusterer, A. E.	1905	243
La Fever, C. A.	1899	217
Lafler, W. A.	1903	231
Lake, G. B.	1869	153
Lamont, G. T.	1896	202
Lamont, R. P.	1891	182
Lancashire, F. H.	1902	227
Lane, C. H.	1885	171
Lane, V. H.	1874	160
Larrabee, W. B.	1892	185
Lathrop, D. W.	1905	243
Lederle, G. A.	1881	167
Lee, T. B.	1896	202
Leefe, F. E.	1901	224
Leeson, C. G.	1901	224
Le Favour, D.	1895	195
Lehnartz, W.	1900	220
Leland, O. M.	1900	220
Leonard, H. B.	1895	195
Lewen, R.	1905	243
Lodewyck, A. G.	1903	231
Lewis, H.	1904	237
Lewis, H. W.	1866	150
Lewis, J. A.	1888	175
Lewis, J. G.	1897	206
Lichtenstein, M.	1894	192
Lilly, G. W.	1881	167
Linabury, J. E.	1902	227
Lindau, A. E.	1900	220
Liskow, B. H.	1901	224
Littlefield, J. L.	1871	156
Livingstone, W. A.	1889	177
Lodewyck, A. C.	1903	231
Loeffler, E. T.	1886	171
Loomis, C. B.	1900	220
Louckes, F. I.	1903	231
Loud, F. H.	1900	220
Lunn, E.	1899	217
Lunn, G. W.	1900	220
Loughnane, G.	1887	174
Loveridge, F. H.	1889	177
Lungren, C. M.	1874	160
Luten, D. B.	1894	192
Lyman, R. R.	1895	196
Lyon, E. D.	1897	206
Lyster, T. L. B.	1901	224
McAfee, J. E.	1904	238
McAllaster, E. L.	1889	177
McBain, W. C.	1904	238
McCloy, R. R.	1902	227
McColl, T. D.	1896	202
McCrickett, T. F.	1897	206
MacDonald, A. T.	1905	243
McDonald, B.	1886	172
McDonnell, H. E.	1904	238
McDougall, A. H.	1901	224
McEwan, W. H.	1882	168
McGee, G. T.	1896	202
MacGregor, W.	1901	224
McHarg, W. S.	1868	152
McKee, W. M.	1899	217
McKenzie, D.	1865	149
McLean, F. M.	1904	238
McLean, H. A.	1900	221
McMullen, G. K.	1896	202
McMullen, R. W.	1905	243
MacNaughton, G. D.	1901	224
McNeil, M. C.	1902	227
Mahon, R. L'H.	1888	175
Mann, E. G.	1878	164
Manning, R. G.	1890	180
Mansfield, J. R.	1904	238
Mansfield, R. J.	1900	221
Marquardt, C. R.	1896	202
Marr, G. A.	1863	148
Marsh, D. E.	1903	231
Marsh, E. P.	1898	212
Marsh, H. S.	1900	221
Marsh, W. J.	1898	212
Marshall, A. C.	1893	188

THE UNIVERSITY BULLETIN IS ISSUED BY THE UNIVERSITY
THAN AS OFTEN AS EVERY SIX WEEKS DURING THE
YEAR.

ENTERED AS SECOND-CLASS MATTER AT THE
ARBOR, MICHIGAN.

THE BULLETIN INCLUDES THE FOLLOWING PUBLICATIONS:

- The Annual Report of the President.
- The Calendar of the University.
- The Annual Announcements of the Department of
  Science, and the Arts, the Graduate School, the
  of Engineering, of Medicine and Surgery, and of
  School of Pharmacy, the Homoeopathic Medical
  College of Dental Surgery, and the Summer
- Other Announcements of the several departments
  Reports of University officers, etc.

Library

71

1/6/25

106-07

1st sem

[September, 1906.

UNIVERSITY OF MICHIGAN

SPECIAL ANNOUNCEMENT

OF THE

DEPARTMENT OF ENGINEERING

FIRST SEMESTER—1906-7

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students desiring to enter the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission. After having been admitted, they should at once register with the Secretary of the University in University Hall and then pay their fees to the Treasurer in the South wing of University Hall. They should then obtain any advanced credit to which they may be entitled and report for classification as directed in the following paragraphs.

Advanced Credits. Students who believe they have completed some courses offered in the University other than those required for entrance, and who desire to obtain advanced credit for such courses, should apply to the Associate Dean at the time of admission for a blank upon which the subjects in which credit is desired will be checked. This blank should then be taken to the professor representing the department, who may be found at the time and place indicated under heading *Consultation Hours.*

CONSULTATION HOURS.

On Saturday, Sept. 22, the consultation hours will be from ten to twelve; on the following Monday and Tuesday from ten to twelve and two to four. After that day, each professor will post his own office hours. In cases where two offices are indicated for the same professor, that first given is the one where he may be found on the three classification days. The other is his regular office.

English	Mr. Bohn, Room 317, (25).
French, German, and Spanish	Assistant Professor Wait. Room 3, Old Engineering Building.
Mathematics	Professor Ziwet. Room 312.
Physics	Professor Carhart. Physical Laboratory.
Chemistry	Professor Campbell. Room 101, Chemical Laboratory.
Metallurgy	
Astronomy	Professor Hussey, Observatory.
Mineralogy	Assistant Professor Kraus. Tappan Hall, Basement.
Geology	Professor Hobbs. Room 6, top floor, Museum.
Drawing	Professor Denison. Room 414.
Shop Practice	Superintendent Miggett. Engineering Shops.
Surveying	Professor Davis. Room 6.
Civil Engineering	Professor Williams. Room 205, (207).
Mechanical Engineering	Professor Allen. Room 217, (215)
Electrical Engineering	Professor Patterson. Room 201, (108).
Naval Architecture and Marine Engineering	Professor Sadler. Room 327.
Architecture	Professor Lorch. Room 313, (412).

CLASSIFICATION OF FIRST YEAR STUDENTS

Students entering the Department will be classified on Saturday, Sept. 22, and the following Monday and Tuesday, by Assistant Professor Wrentmore and Assistant Professor Butts, in Room 409, on the top floor of the New Engineering Building, in accordance with the following schedule. An exception is made in the case of students who have obtained over twenty-five hours advanced credit, who may report for classification with the division to which they think they belong.

Treasurer's receipt must be presented at time of classification.

Nos. 2608 to 2644, Saturday, Sept. 22 at 8 A. M.
Nos. 2645 to 2680, Saturday, Sept. 22 at 10 A. M.
Nos. 2681 to 2716, Saturday, Sept. 22 at 2 P. M.
Nos. 2717 to 2752, Saturday, Sept. 22 at 4 P. M.
Nos. 2753 to 2788, Monday, Sept. 24 at 8 A. M.
Nos. 2789 to 2824, Monday, Sept. 24 at 10 A. M.
Nos. 2825 to 2860, Monday, Sept. 24 at 2 P. M.
Nos. 2861 to 2896, Monday, Sept. 24 at 4 P. M.
Nos. 2897 to 2932, Tuesday, Sept. 25 at 8 A. M.
Nos. 2933 to 2968, Tuesday, Sept. 25 at 10 A. M.
Nos. 2969 to 3004, Tuesday, Sept. 25 at 2 P. M.
Nos. 3005 to 3040, Tuesday, Sept. 25 at 4 P. M.

Students entering the University after Sept. 25 will find directions for classification on the Faculty Bulletin Board in the Old Engineering Building.

CLASSIFICATION OF SECOND YEAR STUDENTS

Hours, Monday and Tuesday, Sept. 24 and 25, 8-12 and 2-5.

Students entering the second year must be prepared to choose the branch of engineering in which they desire to specialize. They will report first in Room 309 and afterwards in the following divisions:

Civil Engineers	Assistant Professor Tilden. Room 301.
Mechanical Engineers	Mr. Bursley. Room 318.
Electrical Engineers	Assistant Professor Bailey. Room 312.
Chemical Engineers	Assistant Professor White. Room 313.
Marine Engineers	Professor Sadler. Room 327.
Architects and Architectural Engineers	Professor Lorch. Room 313.
Special Students	Assistant Professor White. Room 313.

CLASSIFICATION OF THIRD YEAR STUDENTS

Hours, Monday and Tuesday, Sept. 24 and 25, 8-12 and 2-5.

Civil Engineers	Assistant Professor Greene. Room 205.
Mechanical Engineers	Professor Anderson. Room 219.
Electrical Engineers	Assistant Professor Morehouse. Room 201.
Chemical Engineers	Professor Campbell. Room 101, Ch.
Marine Engineers	Professor Sadler. Room 327.
Architects and Architectural Engineers	Professor Lorch. Room 313.

CLASSIFICATION OF FOURTH YEAR STUDENTS

Hours, Monday and Tuesday, Sept. 24 and 25, 8-12 and 2-5.

Civil Engineers	Professor Williams. Room 205.
Mechanical Engineers	Professor Allen. Room 217.
Electrical Engineers	Professor Patterson. Room 201.
Chemical Engineers	Professor Campbell. Room 101, Ch.
Marine Engineers	Professor Sadler. Room 327.
Architects and Architectural Engineers	Professor Lorch. Room 313.

Enrollment in Classes. After receiving his election blank, the student must at once register in each class to which he has been assigned. The class lists will be in Room 317 on Saturday, Monday and Tuesday; after that date in the Secretary's office.

Late Classification. Students classified after Tuesday must take their classification card at once to the office of the Secretary of the Engineering Department where a duplicate will be made for the office file. In addition, he must show the classification card to each instructor to whose classes he is assigned.

Change of Classification. Until noon of Saturday, Sept. 29, any classifier may at his discretion change a classification previously approved by him. Such change will be made upon a special blank which is to be signed by each instructor whose class the student is entering or leaving and then deposited by the student, within three days from the date of the authorization of the change, in the office of the Secretary of the Engineering Department.

After Saturday, Sept. 29, a student desiring to change his election, or to drop work, must file his request and reasons with the Secretary of the Department and continue in his regularly assigned classes until he has received permission to make a change.

Change of Course. A student desiring to change the course (Civil, Mechanical, or Electrical, etc.) in which he has registered himself as a candidate for a degree, must receive permission from the Associate Dean.

Removal of Conditions. Examinations for the removal of conditions (except entrance conditions for which a separate schedule is provided) will be held on Friday and Saturday, Sept. 21 and 22. A student desiring to enter these examinations must obtain from the Secretary of the Engineering Department a supplementary examination slip and present it to the instructor at least two days before the examination, in order that examination questions may be prepared. This latter requirement will be waived for the courses whose numbers appear in parentheses in the following list and in those courses the instructor need not be notified in advance.

The examinations will be held according to the following schedule, and the results will, so far as possible, be in the hands of the classifiers on Monday morning.

SUBJECT.	TIME.	ROOM.	INSTRUCTOR.
English	F 10-12	21	....
German (1, 2, 3, 4)	F 8-10	1	Mr. Menger
French (1, 2, 3, 4)	F 8-10	26	Mr. Adams
Spanish (1, 2)	F 8-10	26	Mr. Adams
Mathematics (1, *1a*, 2)	F 4-6	409	Mr. Love
Mathematics (3, 4, 5, 6)	F 4-6	313	Dr. Field
Physics	S 8-10	...	....
Chemistry	F 2-4	205 Ch.	Mr. Zimmerschied
Metallurgy (1)	F 2-4	205 Ch.	Mr. Zimmerschied
Mineralogy	S 4-6	Min. Lec. Rm.	Professor Kraus
Geology	S 4-6	...	Professor Hobbs
Drawing (4, 5)	S 10-12	309	Asst. Prof. Goulding
Shop Practice	S 4-6	...	....
Surveying (1)	F 10-12	301	Asst. Prof. Merrick
Civil Engineering	S 2-4	...	....
Mechanical Engineering (1)	F 10-12	409	Mr. Bartlett
Mechanical Engineering (3, 5)	F 10-12	219	Prof. Anderson
Electrical Engineering (1)	S 10-12	201	Asst. Prof Bailey
Naval Architecture	F 8-10	...	....

Commencement of Work. Classes in the Engineering Department will begin on Wednesday, Sept. 26, and on and after that date all classes will meet at their regular hours.

SCHEDULE OF COURSES.

ABBREVIATIONS: U.—University Hall. T.—Tappan Hall. Phys.—Physics Laboratory. Ch.—Chemical Laboratory.

ENGLISH

1. Paragraphing and Theme Writing. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 10	21	Mr. Marckwardt.
II.	M T Th F	at 10	22	Mr. Breitenbach
III.	M T Th F	at 11	21	Mr. Bohn.
IV.	M T Th F	at 11	22	Mr. Breitenbach.
V.	M T Th F	at 2	21	Mr. Marckwardt.
VI.	M T Th F	at 2	22	Mr. Breitenbach.
VII.	T W Th F	at 3	21	Mr. Bohn.
VIII.	T W Th F	at 3	22	Mr. Marckwardt.

5. Technical Writing. Specifications and Contracts. *Two Hours.*
T Th at 3. Room 24. Mr. Breitenbach.

6. Advanced Composition. Essays in Exposition. *Two hours.*
T Th at 2. Room 312. Mr. Bohn.

GERMAN

1. Elementary Course. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 9	10	Mr. Hauhart.
II.	M T Th F	at 2	28	Mr. Menger.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
O.K. ~~I.~~	~~M T Th F~~	~~at 10~~	32	Mr. Menger.

3. German Scientific Literature. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
~~I.~~	~~M T Th F~~	~~at 8~~	~~10~~	~~Mr. Hauhart.~~
II.	M T Th F	at 8	1	Mr. Menger.
III.	M T Th F	at 9	32	Asst. Prof. Wait.
~~IV.~~	~~M T Th F~~	~~at 10~~	~~1~~	~~Asst. Prof. Wait.~~
V.	M T Th F	at 2	10	Mr. Hauhart.
~~VI.~~	~~M T Th F~~	~~at 8~~	~~1~~	~~Asst. Prof. Wait.~~
~~VII.~~	~~M T Th F~~	~~at 3~~	~~26~~	~~Mr. Hauhart.~~

4. German Scientific Literature continued. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 9	1	Mr. Menger.
~~II.~~	~~M T Th F~~	~~at 10~~	~~10~~	~~Mr. Hauhart.~~
III.	M T Th F	at 2	1	Asst. Prof. Wait.

5. Advanced Course in German Scientific Literature. *Three hours.*

Hours to be arranged. Asst. Prof. Wait.

FRENCH

1. Elementary Course. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
~~I.~~	~~M T Th F~~	~~at 8~~	~~32~~	~~Mr. Kenyon.~~
II.	M T Th F	at 9	22	Mr. Adams.
~~III.~~	~~M T Th F~~	~~at 2~~	~~26~~	~~Mr. Bird.~~
IV.	M T Th F	at 3	32	Mr. Kenyon.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
~~I.~~	~~M T Th F~~	[illegible]	214	Mr. Adams.
O.K. ~~II.~~	~~M T Th F~~	~~at 2~~	32	Mr. Kenyon.

3. French Scientific Literature. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
3/4 I.	M T Th F	at 8	22	Mr. Adams
one. 1/4 ~~II.~~	~~M T Th F~~	~~at 9~~	~~26~~	~~Mr. Bird.~~
III.	M T Th F	at 2	214	Mr. Adams.

4. French Scientific Literature continued. *Four hours.*

SECTION	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 10	219	Mr. ———

5. Advanced Course in French Scientific Literature. *Three hours.*

Hours to be arranged. Mr. Bird.

SPANISH

1. Elementary Course. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 10	26	Mr. Bird.
II.	M T Th F	at 1	32	Mr. Kenyon.

3. Reading, Conversation and Business Correspondence. *Four hours.*

Hours to be arranged. Mr. Adams.

MATHEMATICS

1. Algebra and Analytic Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	218	Mr. Garretson.
II.	M T Th F at 8	27, U	Dr. Karpinski.
III.	M T Th F at 8	327	Mr. Hopkins.
IV.	T W Th F at 9	27, U	Dr. Karpinski.
V.	T W Th F at 9	21	Mr. Garretson.
VI.	T W Th F at 9	402	Mr. Love.
VII.	M W F S at 9	205	Mr. Hopkins.
VIII.	T W Th F at 10	427	Mr. Garretson.
IX.	T W Th F at 10	402	Mr. Love.
X.	T W Th S at 10	428	Mr. Hopkins.
XI.	M T Th F at 11	28	Dr. Karpinski.
XII.	M T Th F at 11	205	Mr. Garretson.
XIII.	M T Th F at 11	402	Mr. Love.
XIV.	M T Th F at 11	1	Mr. Hopkins.
XV.	M T Th F at 11	31	Asst. Prof. Butts.
XVI.	M T Th F at 11	313	Dr. Pierce.

1*a*. Plane Trigonometry. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 9	205	Mr. Hopkins.
II.	T Th at 9	413	Dr. Running.
III.	T Th at 2	309	Dr. Ford.
IV.	T Th at 2	409	Mr. Love.
V.	T Th at 3	318	Mr. Garretson.
VI.	T Th at 3	409	Mr. Love.

2. Analytic Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T W Th F at 2	318	Mr. Escott.

3. Calculus. *Five hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
~~I.~~	~~M T W Th F at 8~~	~~313~~	~~Prof. Ziwet.~~
~~II.~~	~~M T W Th F at 8~~	~~H, U~~	~~Prof. Markley.~~
~~III.~~	~~M T W Th F at 8~~	~~19, U~~	~~Asst. Prof. Glover.~~
IV.	M T Th F S at 8	31	Asst. Prof. Butts.
V.	M T W Th F at 8	217	Dr. Pierce.
~~VI.~~	~~M T W Th F at 8~~	~~6~~	~~Dr. Field.~~
VII.	M T W Th F at 9	24	Mr. Escott.
~~VIII.~~	~~M T W Th F at 9~~	[illegible]	~~Dr. Ford.~~
~~IX.~~	~~M T W Th F at 9~~	~~31~~	~~Asst. Prof. Butts.~~
X.	M T W Th F at 10	313	Dr. Pierce.
XI.	M T W Th F at 10	28	Dr. Karpinski.
XII.	M T W Th F at 10	24	Mr. Escott.
XIII.	M T W Th F at 2	31	Dr. Running.

4. Calculus and Mechanics I. *Five hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T W Th F at 2	313	Dr. Field.

5. Calculus and Mechanics II. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	21	Dr. Ford.
II.	M W F at 8	214	Dr. Running.
III.	M W F at 9	19, U	Asst. Prof. Glover.
IV.	M W F at 8	24	Mr. Escott.
V.	M W F at 9	313	Prof. Ziwet.
VI.	M T F at 9	6	Dr. Field.
VII.	T W F at 10	6	Dr. Field.
VIII.	M W F at 10	31	Asst. Prof. Butts.
IX.	M T F at 10	1, T	Dr. Ford.
X.	M W F at 2	24	Dr. Pierce.

17. Theory of the Potential. *Three hours.*
Hours to be arranged. Prof. Ziwet.

29. Harmonic Analysis. *Two hours.*
Hours to be arranged. Prof. Ziwet.

PHYSICS

1E. Mechanics, Sound and Light. *Five hours.*

Lectures.

SECTION	TIME	ROOM	INSTRUCTOR
I.	T Th at 11	Lec. Room B.	Prof. Carhart.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
~~I.~~	~~M W F at 8~~	~~20 Phys.~~	
~~II.~~	~~M W F at 8~~	~~26~~	
III.	M W F at 8	402	
IV.	M W F at 9	20 Phys.	
V.	M W F at 9	312	
VI.	M W F at 9	28	
~~VII.~~	~~M W F at 10~~	~~20 Phys.~~	
~~VIII.~~	~~M W F at 10~~	~~318~~	
~~IX.~~	~~M W F at 11~~	~~26~~	
~~X.~~	~~M W F at 11~~	~~218~~	
~~XI.~~	~~M W F at 11~~	~~413~~	
~~XII.~~	~~M W F at~~ [illegible]	~~Phys.~~	

— 17

A knowledge of plane trigonometry is indispensable. No student will be admitted to the class who has not had a preparatory course in physics.

3*b*. Physical Laboratory Work. *Two hours.* Fee, $2.00.
Recitations. Hours to be arranged.

Laboratory work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	T	1-5	Lab. B.	
II.	W	8-12	Lab. B.	
~~III.~~	~~Th~~	[illegible]	~~Lab. B.~~	
~~IV.~~	~~S~~	~~8-12~~	~~Lab. B.~~	

3*c*. Laboratory work in Mechanical and Electrical Measurements. *Four hours.* Fee, $4.00.

Recitations. Hours to be arranged.

Laboratory work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M F	1-5	Lab. A.	
II.	T Th	8-12	Lab. A.	
III.	T Th	1-5	Lab. A.	
IV.	W 1-5 S	8-12	Lab. A.	

5. Electrical Measurements. *Four hours.* Fee, $3.00.

Recitations.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	T Th	at 8	409	
II.	T Th	at 9	301	
III.	T Th	at 10	309	

Laboratory Work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	1-5	1-8	
II.	T	1-5	1-8	
III.	W	1-5	1-8	
IV.	Th	1-5	1-8	
V.	F	1-5	1-8	
VI.	S	8-12	1-8	

7. Intermediate Course in Electricity and Magnetism. *Two hours.* Prof. Carhart. Hours to be arranged.

8. Theory of Heat. *Two hours.* Asst. Prof. Randall. Hours to be arranged.

9. Heat, Laboratory Work. *Two hours.* Fee, $2.00. Asst. Prof. Randall. Hours to be arranged.

10. Mathematical Electricity and Magnetism. *Three hours.* Prof. Patterson.

CHEMISTRY

1. Elementary Inorganic Chemistry. *Two hours.*

Lectures M and F at 11. Lower Leecture Room, Old Medical Building. **Dr. Hale**

Recitations.

SECTIONS	TIME		ROOM	INSTRUCTOR
A.	T	at 11	Old. Med. Bldg.	Dr. Hale
B.	W	at 11	205, Ch.	Dr. Hale
C.	Th	at 11	Old. Med. Bldg.	Dr. Hale

1*a*. Elementary Inorganic Chemistry. *Two hours.*

Two laboratory periods and one hour of recitation and laboratory work. Fee, $10.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W morning	206 Ch.	
II.	T Th morning	206 Ch.	
III.*	M(1-3) W(1-4)	211 Ch.	
IV.*	T(1-3) Th(1-4)	206 Ch.	

*Sections III and IV are for engineers. The others are for literary students.

2E. Principles of Inorganic Chemistry. *Four hours.*

Lectures W at 11, and S at 11. Lower Lecture Room, Old Medical Building. Mr. Smeaton.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F at 8	203, Ch.	Mr. ———
II.	T Th at 8	203, Ch.	Mr. ———
III.	M F at 9	301	Mr. ———
IV.	M F at 10	205, Ch.	Mr. ———
V.	T Th at 10	31	Mr. ———
VI.	M F at 11	318	Mr. ———
VII.	T Th at 11	301	Mr. ———

3. Qualitative Analysis. *Seven hours.*

Sec. I. M W F at 8. Room 205, Ch. Prof. Johnson.

Four laboratory periods of three hours each. Open to those who have completed Courses 2 or 2E. Fee, $15.

3*a*. Qualitative Analysis. *Four hours.*

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	205, Ch.	Prof. Johnson
II.	M F at 11	205, Ch.	Dr. Balcom

Laboratory Work.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-4	214, Ch.	
II.	T Th 1-4	214, Ch.	

Open to those who have completed Courses 2 or 2E. Fee, $10. Both sections are for civil engineers and owing to the crowded condition of the laboratory it is extremely improbable that others can be accommodated. Students who will be greatly inconvenienced if they can not take the course this semester may make application to Assistant Professor White.

The University Bulletin is Issued by the University of
gan as Often as Every Six Weeks During the
Year.

Entered as Second-Class Matter at the Postoffice
Arbor, Michigan.

The Bulletin Includes the Following Publications:
The Annual Report of the President.
The Calendar of the University.
The Annual Announcements of the Department of Li
Science, and the Arts, the Graduate School, the Depa
of Engineering, of Medicine and Surgery, and of L
School of Pharmacy, the Homœopathic Medical Coll
College of Dental Surgery, and the Summer Session
Other Announcements of the several departments of inst
Reports of University officers, etc.

'71
16,125
106-07
1st sem

[September, 1906.

UNIVERSITY OF MICHIGAN

SPECIAL ANNOUNCEMENT

OF THE

DEPARTMENT OF ENGINEERING

FIRST SEMESTER—1906-7

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students desiring to enter the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission. After having been admitted, they should at once register with the Secretary of the University in University Hall and then pay their fees to the Treasurer in the South wing of University Hall. They should then obtain any advanced credit to which they may be entitled and report for classification as directed in the following paragraphs.

Advanced Credits. Students who believe they have completed some courses offered in the University other than those required for entrance, and who desire to obtain advanced credit for such courses, should apply to the Associate Dean at the time of admission for a blank upon which the subjects in which credit is desired will be checked. This blank should then be taken to the professor representing the department, who may be found at the time and place indicated under heading *Consultation Hours.*

2. General Mineralogy. *Five hours.*

   Lectures.

   M T W Th F at 8. Mineralogical Lecture Room, T. H.
   Laboratory work. *Five hours, to be arranged.*
   Prof. Kraus and Mr. Hunt.

   Course 2 must be preceded by Courses 2 and 3 in Chemistry.
3. Crystal Measurements. *Three hours.*
   Lectures and laboratory work to be arranged. Prof. Kraus.
4. Determinative Mineralogy.

   Laboratory work. *Two hours, to be arranged.* Mr. Hunt.
   Course 4 is open to those who have completed Course 1.
5. Blowpipe Methods. *Two hours.*

   Lectures M and W at 8. Blowpipe Room. Mr. Hunt.
   Laboratory work. *Two hours, to be arranged.*
   Must be preceded by Course 2 or Courses 1 and 4.
8. Research Work. Credit to be arranged. Prof. Kraus.

GEOLOGY

1. Elementary Geology. Lectures, recitations and excursions. *Three hours.*

   Lectures M W at 11. Recitations F at 11. Museum Lecture Room. Professor Hobbs.
3. Physiography. *Three hours.*

   M W F at 3. Museum Lecture Room. Professor Hobbs.
5. Seismic Geology. Advanced course.
   T Th at 10. Professor Hobbs.
6. Current Literature of Geology. Advanced course. *One hour, to be arranged.* Professor Hobbs.

DRAWING

1. Geometrical Drawing. (Elective.) *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
1.	M T Th F from 2-4	403	Mr. ———

2. Free-hand Drawing. (Elective.) *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F from 8-10	35	**Miss Hunt.**
I.	M W F from 1-3	35	**Miss Hunt.**

4. Descriptive Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
3/4 I. Recitation	M W F at 8	413	Mr. ———
Drawing	F from 1-3	415	Mr. Finch
II. Recitation	M W F at 8	427	Mr. Finch
Drawing	F from 1-3	415	Mr., Finch
~~III. Recitation~~	~~M W F at 9~~	~~427~~	~~Mr. Fishleigh~~
~~Drawing~~	~~Th from 1-3~~	~~415~~	~~Mr. Finch~~
~~IV. Recitation~~	~~M W F at 9~~	~~413~~	~~Mr. G. F. Hunt~~
~~Drawing~~	~~Th from 1-3~~	~~413~~	~~Mr. Finch~~
~~V. Recitation~~	~~M W F at 10~~	~~413~~	~~Mr. ———~~
~~Drawing~~	~~S from 8-10~~	~~418~~	~~Mr. ———~~
~~VI. Recitation~~	~~M W F at 10~~	~~401~~	~~Mr. Finch~~
~~Drawing~~	~~S from 8-10~~	~~418~~	~~Mr. ———~~
~~VII. Recitation~~	~~M W F at 11~~	~~427~~	~~Mr. Fishleigh~~
~~Drawing~~	~~W from 1-3~~	~~Hall~~	~~Mr. Finch~~
VIII. Recitation	T Th S at 11	413	Mr. ———
Drawing	W from 1-3	Hall	Mr. G. F. Hunt
IX. Recitation	T Th S at 8	427	Mr. Finch
Drawing	F from 1-3	Hall	Mr. G F. Hunt

5. Advanced Projections and Stereotomy. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. Recitation	M T Th F at 9	428	Asst. Prof. Goulding
Drawing	S from 8-12	415	Asst. Prof. Goulding
II. Recitation	M T Th F at 10	409	Prof. Denison
Drawing	S from 8-12	415	Asst. Prof. Goulding

6. Advanced Projections. *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. Recitation	T Th at 8	428	Asst. Prof. Goulding
Drawing	T from 2-4	415	Mr. Finch
2/4 II. Recitation	T Th at 9	409	Prof. Denison
Drawing	M from 2-4	403	Mr. ———
III. Recitation	T Th at 9	401	Mr. Bartlett
Drawing	M from 2-4	Hall	Mr. Finch
IV. Recitation	T Th at 10	401	Mr. Bartlett
Drawing	T from 2-4	415	Mr. Bartlett

10. Free-Hand Lettering. (Elective.) *Two hours.*
Sec. I. T Th from 2-4. Room 403. Mr. ———.

22. Architectural Drawing (A) II. *Four hours.*
Sec. I. T, 2-6; Th, 1-5; and S from 8-12. Room 35.
Mr. G. F. Hunt.

SHOP PRACTICE

1. Woodwork, Pattern-Making, Foundry, Forging and Metal Forming and Cutting Operations. *Four hours.*
   Fee, $10.00. Mr. McDonald and Mr. ———.

SECTIONS		TIME	TIME OF QUIZ
I.	M F	from 7:30-12	T at 1
II.	T Th	from 7:30-12	W at 10
III.	W S	from 7:30-12	F at 1
IV.	M F	from 1-5:30	W at 2
V.	T Th	from 1-5:30	W at 3

2. Pattern-Making and Foundry. (Advanced.) *Four hours.*
   Fee, $10.00. Mr. Bull and Mr. ———.

SECTIONS		TIME	TIME OF QUIZ
I.	M F	from 1-5:30	T at 2
II.	T Th	from 1-5:30	W at 11

3. Machine Shop. *Four hours.*
   Fee, $10.00. Mr. Cobb.

SECTIONS		TIME	TIME OF QUIZ
I.	M F	from 1-5:30	W at 11
II.	T Th	from 1-5:30	W at 2

4. Pattern-Making, Foundry and Machine Shop.
   Fee, $10.00. Mr. Cobb, Mr. Bull and Mr. ———.
   Sec. I. W (1-5:30), S (7:30-12). **M at 2**

SURVEYING

1. Lectures. Text-book and Field Practice. *Five hours.*
   Sec. I. M T W Th F from 1-5. Room 301.
   Professor Davis and Assistant Professor **Merrick.**
   Owing to the large number of students **required to take this** course during this semester, others may **elect it only with** with the permission of Assistant **Professor Merrick.**
2. Continuation of Course 1.
   Lecture M T W Th F at 10. Room 301. **Professor Davis.**
   Field Work and Drawing during a portion **of the semester.**
   M T W Th F from 1-5. Room 302.
   Prof. Davis, Assistant Prof. **Merrick, and Mr. Smoots.**
4. Use of Instruments. *One hour.* **Professor Davis and Mr.** Atwell.

   Lectures.

SECTIONS	TIME		ROOM
I.	W	at 8	301
II.	W	at 9	301
III.	Th	at 8	301

Field Work.

SECTIONS			TIME
I.	S	from	8-12
II.	M	from	9-12
III.	W	from	8-12
IV.	F	from	8-12

CIVIL ENGINEERING

1. Structural Mechanics. *Five hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M T W Th F	at 8	312	Asst. Prof. Greene
II.	M T W Th F	at 8	203	Asst. Prof. Tilden
III.	M T W Th F	at 8	216	Mr. ———
IV.	M T W Th F	at 9	218	Mr. Stroebe
V.	M T W Th F	at 9	203	Asst. Prof. Tilden
VI.	M T W Th F	at 10	218	Mr. ———
VII.	M T W Th F	at 11	203	Mr. Stroebe

Must be preceded or accompanied by Course 5 in Mathematics.

2. Theory and Analysis of Structures. *Four hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M T Th F	at 10	216	Asst. Prof. Greene
II.	T W Th F	at 10	312	Asst. Prof. Wrentmore
III.	T W Th F	at 11	312	Asst. Prof. Wrentmore

Must be preceded by Course 1.

3. Structural Design. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T W Th F	from 2-5	307	Asst. Prof. Greene
II.	M T W Th F	from 2-5	418	Asst. Prof. Wrentmore
III.	M T W Th F	from 2-5	418	Mr. ———

Must be preceded or accompanied by Course 2.

5. Hydraulics. *Four hours.*

Lecture to entire class, M at 10. Room 309
Prof. Williams

Quiz.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	T W Th F	at 8	205	Prof. Williams
II.	T W Th F	at 10	205	Prof. Williams
III.	T W Th F	at 10	203	Mr. Stroebe

Must be preceded or accompanied by Course 6 in Mathematics, and by Course 1 in Civil Engineering.

6. Municipal Engineering. *Two hours.*
   Sec. I. T Th F at 9. Room 309. Prof. Williams.
   Must be preceded by Course 1 and preceded or accompanied by Course 5.
8. Experimental Hydraulics. *Three hours.*
   Hours to be arranged. Prof. Williams.
   Must be preceded by Course 5.
10. Testing Materials. *Two hours.*
   Lecture, M at 11. Room 312. Asst. Prof. Tilden.
   Laboratory hours to be arranged.
   Must be preceded by Course 1.

MECHANICAL ENGINEERING

1. Principles of Mechanism. *Four hours.*

Lectures.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	W at 10	409	**Prof. Denison**
II.	W at 11	409	**Prof. Denison**

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	409	**Mr. Fishleigh**
II.	M W F at 8	428	**Asst. Prof. Goulding**
III.	M W F at 8	401	**Mr. Bartlett**
IV.	M W F at 9	409	**Prof. Denison**
V.	M W F at 9	401	**Mr. Bartlett**
VI.	T Th F at 11	409	**Prof. Denison**
VII.	T Th F at 1	428	**Asst. Prof. Goulding**
VIII.	T Th F at 3	401	**Mr. Fishleigh**

Drawing.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	Th from 2-4	Hall	**Mr. Bartlett**
II.	M from 1-3	415	**Asst. Prof. Goulding**
III.	Th from 10-12	415	**Mr. Fishleigh**
IV.	W from 2-4	415	**Mr. Bartlett**
V.	W from 2-4	403	**Mr. Fishleigh**
VI.	M from 1-3	415	**Mr. Bartlett**
VII.	S from 8-10	403	**Mr. Fishleigh**
VIII	W from 2-4	415	**Asst. Prof. Goulding**

2. Sketching of Machine Details. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F from 8-12	202	**Mr. Higbie**
II.	T Th from 1-5	315	**Mr. Emswiler**
III.	W(1-5) S(8-12)	202	**Ast. Prof. Hazelton**

3. Steam Engines and other Heat Engines. *Four hours.* Lectures W at 10. Room 309. Prof. Allen

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M T Th F	at 9	219	Mr. Bursley
II. M T Th F	at 11	219	Mr. Bursley
III. M T Th F	at 3	219	Mr. Bursley

Must be preceded by Course 2 in Physics and 4 in Mathematics.

4. Machine Design. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M F	from 1-5	Shops	Mr. Noble
II. T Th	from 1-5	Shops	Supt. Miggett
III. W(1-5) S(8-12)		Shops	Mr. Noble

Must be preceded by Course 1.

5. Thermo-dynamics. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M W F	at 9	214	Prof. Anderson
II. M W F	at 11	214	Prof. Anderson

6. Theory Machine Design. *Five hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M T W Th F	at 8	318	Asst. Prof. Hazelton
II. M T W Th F	at 9	318	Asst. Prof. Hazelton
III. M T W Th F	at 8	219	Mr. Knight

Must be preceded by Courses 1 and 4 and Course 1 in Civil Engineering.

7. Steam Laboratory. *Two hours.* Fee, $5.00.

SECTIONS	TIME	ROOM	INSTRUCTOR
I. T	from 1-5 :30		Mr. Higbie
II. Th	from 1-5 :30		Mr. Higbie
III. S	from 8-12		Mr. Emswiler
IV. M	from 1-5 :30		Mr. Emswiler
V. W	from 1-5 :30		Mr. Bursley

Must be preceded by Course 3.

8. Machine Design. Hoisting Machinery. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M F	from 1-5	315	Mr. Knight
II. T Th	from 1-5	315	Mr. Knight

Must be preceded by Course 4 and preceded or accompanied by Course 6 or preceded by Courses 1, 2, and 3 in Civil Engineering.

9. Steam Laboratory. *Three hours.* Fee, $5.00.

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M F	from 1-5:30		Mr. Higbie
II.	T Th	from 1-5:30		Prof. Anderson
III.	W(1-5:30)S(8-12)			Mr. Emswiler

Must be preceded by Course 7.

10. Machine Design. Engines and Boilers. *Three hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M W	from 1-4	315	Asst. Prof. Hazelton

11. Gas Engines. *Two hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M W	at 9	217	Prof. Allen
II.	T Th	at 10	217	Prof. Allen

Must be preceded by Course 5.

13. Heating and Ventilation. *Two hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M W	at 11	217	Prof. Allen
II.	T Th	at 11	217	Prof. Allen

Must be preceded by Course 3.

ELECTRICAL ENGINEERING

1. Dynamo-Electric Machinery. *Four hours.* Fee, $1.00.

Lectures.

SECTIONS		TIME	ROOM	INSTRUCTOR
	M W	at 8	309	Prof. Patterson

Recitations.

I.	T Th	at 8	309	Prof. Patterson
II.	T Th	at 10	413	
III.	T Th	at 11	201	

Laboratory Work.

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	M	from 10-12	101	
II.	W	from 10-12	101	
III.	W	from 1-3	101	
IV.	W	from 3-5	101	
V.	F	from 1-3	101	
VI.	F	from 3-5	101	
VII.	S	from 8-10	101	
VIII.	S	from 10-12	101	

Course 1 must be preceded by Courses 1, 2, 3, and 4 (or 3c) in Physics.

3. **Alternating Current Generators and Transformers.** ***Four hours.*** **Fee, $1.00.**

Lectures and Recitations.

SECTIONS				TIME	ROOM	INSTRUCTOR
I.	M	W	F	at 9	201	Prof. Patterson
II.	M	W	F	at 11	201	Prof. Patterson

Laboratory Work.

SECTIONS					TIME	ROOM	INSTRUCTOR
I.	M				from 1-4	102	Asst. Prof. Bailey
II.		W			from 1-4	102	Asst. Prof. Bailey
III.			F		from 1-4	102	Asst. Prof. Morehouse
IV.				S	from 8-11	102	Asst. Prof. Morehouse

Course 3 must be preceded by Course 2.

5. **Design of Electrical Machinery and Appliances.** ***Four hours.***

Lectures and Recitations.

SECTION			TIME	ROOM	INSTRUCTOR
I.	T	Th	at 8	201	Asst. Prof. Bailey

Drawing.

SECTION			TIME	ROOM	INSTRUCTOR
I.	T	Th	from 1-5	202	Asst. Prof. Bailey and Mr. Spencer

Course 5 must be preceded by Courses 1 or 2.

7. Photometry of Electric Lamps. *One hour.* Fee, $1.00.

Lectures and Recitations.

SECTION		TIME	ROOM	INSTRUCTOR
I.	M	at 10	201	Prof. Patterson

Laboratory Work. Hours to be arranged.
Course 7 must be preceded by Courses 1 or 2.

9. Storage Battery Installations. *Two hours.*

Lectures and Recitations.

SECTION			TIME	ROOM	INSTRUCTOR
I.	T	Th	at 10	201	Asst. Prof. Bailey

11. Electric Generating Stations and Sub-stations. *One hour.*

Lectures and Recitations.

SECTION		TIME	ROOM	INSTRUCTOR
I.	F	at 10	201	Asst. Prof. **Bailey**

Must be preceded by Courses 1 or 2.

13. Telephone, Telegraph and Related Apparatus. ***Two hours.***

Lectures and Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I. T Th	at 9	201	**Asst. Prof. Morehouse**
II. W F	at 8	201	**Asst. Prof. Morehouse**

Course 13 must be preceded or accompanied by **Courses 1 or 2.**

15. Telephone, Telegraph and Related Apparatus. ***Two hours.*** Fee, $2.00.

Laboratory Work.

SECTIONS	TIME	ROOM	INSTRUCTOR
I. M	from 1-6	111	**Asst. Prof. Morehouse**
II. W	from 1-6	111	**Asst. Prof. Morehouse**
III. Hours to be arranged		111	**Asst. Prof. Morehouse**

Course 15 must be preceded or accompanied by **Course 13.**

17. Applied Electrical Engineering. ***Two hours.***

Lectures and Recitations.

SECTION	TIME	ROOM	INSTRUCTOR
I. W F	at 11	327	**Asst. Prof. Bailey**

Continuation of Course 1; not open to **Electrical Engineers.**

NAVAL ARCHITECTURE AND MARINE ENGINEERING

1. Naval Architecture. Structural Design. ***One hour.***

Lectures and Recitations.

Th at 10. Room 327. **Prof. Sadler**

2. Naval Architecture. Ship Calculations. ***Two hours.***

Lectures and Recitations.

M W at 9. Room 327. **Prof. Sadler**

3. Naval Architecture. Strength of **Ships and Preliminary** Design. *Two hours.*

Lectures and Recitations.

M W at 10. Room 327. **Prof. Sadler.**

Course 3 must be preceded or accompanied **by Course 2.**

5. Naval Architecture. Mould Loft and **Structural Drawing.** *Two hours.*

Afternoons. Room 323. **Mr. Bragg**

6. Naval Architecture. Ship Drawing **and Design. *Three*** *hours.*

W (1-5) S (8-12). Room 323. **Prof Sadler and**
Mr. Bragg

8. **Marine Boilers.** ***One hour.***

Lectures and Recitations.

W at 8. Room 327. Mr. Bragg

9. **Marine Engines.** ***Two hours.***

Lectures and Recitations.

I.	**T**	**Th**	**at 9**	**214**	**Mr. Bragg**
II.	**T**	**Th**	**at 11**	**318**	**Prof. Sadler**

Computing Sections.

F at 9 and F at 11.

10. **Marine Boilers. Drawing and Design.** ***Two hours.***
Afternoons. Room 323. Mr. Bragg
Course 10 must be preceded or accompanied by Course 8.

ARCHITECTURE

1. Elementary Design. **Lectures and Drawing.** ***Two hours.***
M W F 1-5 **during the first half of the semester.**
Room 404. Professor Lorch.
2. Elements of Architecture. **Lectures and Drawing.** ***Two hours.***
M W F from 1-5 during the second half of the semester.
Must be preceded by Drawing 4, 5, and 21.
4. Architectural Design I. ***Three hours.***
5. Architectural Design II. ***Three hours.***
9. Architectural Design (A E) III. *Two hours.*
Hours for Courses 4, 5 and 9 to be arranged with **Professor** Lorch.
11. History of Architecture; Ancient. Lectures and Drawing. *Two hours.* Professor Lorch.
Lecture T at 1. Room 309.
Drawing W 8-10. Room 404.

GYMNASIUM PRACTICE

Professor Fitzpatrick.

SECTIONS					TIME
I.	M		Th		11:15
II.	M			F	4:15
III.		T	Th		4:15
IV.	M			F	5:15
V.		T	Th		5:15
VI.	M		Th		8:00

/
6/25
/07
hem

[February, 1907.

UNIVERSITY OF MICHIGAN

SPECIAL ANNOUNCEMENT

OF THE

DEPARTMENT OF ENGINEERING

SECOND SEMESTER—1906-7

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students desiring to enter the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission. If they believe they have completed any courses offered in the University other than those required for entrance, and desire to obtain advanced credit for such courses, they should apply to the Associate Dean at the time of admission for a blank upon which the subjects in which credit is desired will be checked. The amount of credit, if any, to be given in the various subjects will be decided by the professors representing the several departments, who may be found at the times and places indicated under heading *Consultation Hours.*

After having been admitted, students should at once register with the Secretary of the University in University Hall and then pay their fees to the Treasurer in the South wing of University Hall. They should then obtain any advanced credit to which they may be entitled and report for classification as directed in the following paragraphs.

7/
6 [illegible] s
6/07
sem

[February, 1907.

UNIVERSITY OF MICHIGAN

SPECIAL ANNOUNCEMENT

OF THE

DEPARTMENT OF ENGINEERING

SECOND SEMESTER—1906-7

DIRECTIONS FOR REGISTRATION AND CLASSIFICATION.

Entrance. Students desiring to enter the Department of Engineering should present themselves, with their credentials, to the Associate Dean in his office in Room 6 of the *old* Engineering building for admission. If they believe they have completed any courses offered in the University other than those required for entrance, and desire to obtain advanced credit for such courses, they should apply to the Associate Dean at the time of admission for a blank upon which the subjects in which credit is desired will be checked The amount of credit, if any, to be given in the various subjects will be decided by the professors representing the several departments, who may be found at the times and places indicated under heading *Consultation Hours.*

After having been admitted, students should at once register with the Secretary of the University in University Hall and then pay their fees to the Treasurer in the South wing of University Hall. They should then obtain any advanced credit to which they may be entitled and report for classification as directed in the following paragraphs.

Enrollment in Classes. After receiving his election blank, the student must at once register in each class to which he has been assigned. The class lists will be in Room 317 on Monday and Tuesday; after that date in the Secretary's office.

Late Classification. Students classified after Tuesday must take their classification card at once to the office of the Secretary of the Engineering Department where a duplicate will be made for the office file. In addition, he must show the classification card to each instructor to whose classes he is assigned.

Change of Classification. Until noon of Saturday, Feb. 16, any classifier may at his discretion change a classification previously approved by him. Such change will be made upon a special blank which is to be signed by each instructor whose class the student is entering or leaving and then deposited by the student, within three days from the date of the authorization of the change, in the office of the Secretary of the Engineering Department.

After Saturday, Feb. 16, a student desiring to change his election, or to drop work, must file his request and reasons with the Secretary of the Department and continue in his regularly assigned classes until he has received permission to make a change.

Change of Course. A student desiring to change the course (Civil, Mechanical, or Electrical, etc.) in which he has registered himself as a candidate for a degree, must receive permission from the Associate Dean. They are asked to attend to matters of this sort before the regular classification days.

Commencement of Work. Classes in the Engineering Department will begin on Wednesday, Feb. 13, and on and after that date all classes will meet at their regular hours.

SCHEDULE OF COURSES.

ABBREVIATIONS: U.—University Hall. T.—Tappan Hall. Phys.—Physical Laboratory. Ch.—Chemical Laboratory.

ENGLISH

1. Paragraphing and Theme Writing. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	21	Mr. Marckwardt.
II.	M T Th F at 10	22	Mr. Breitenbach.
III.	M T Th F at 11	21	Mr. Bohn.
IV.	T W Th F at 2	21	Mr. Marckwardt.
V.	T W Th F at 2	22	Mr. Breitenbach.
VI.	T W Th F at 3	21	Mr. Bohn.

2. Technical Journalism. *Two hours.*
T Th at 3 Room 24 Mr. Breitenbach.

3. Scientific Literature. Readings, discussions, and essays. *Two hours.* Mr. Marckwardt.

6. Advanced Composition. Essays in exposition. *Two hours.*
T Th at 2 Room 312 Mr. Bohn.

GERMAN

1. Elementary Course. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 1	6	Mr. Weck.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	10	Mr. Hauhart.
II.	M T Th F at 10	404	Mr. Weck.
III.	M T Th F at 2	6	Mr. Menger.

3. German Scientific Literature. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	1	Mr. Menger.
II.	M T Th F at 10	10	Mr. Hauhart.
III.	M T Th F at 2	1	Asst. Prof. Wait.

4. German Scientific Literature continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	10	Mr. Hauhart.
II.	M T Th F at 9	22	Mr. Menger.
III.	M T Th F at 9	1	Asst. Prof. Wait.
IV.	M T Th F at 10	1	Mr. Menger.
V.	M T Th F at 2	10	Mr. Weck.
VI.	M T Th F at 3	1	Mr. Hauhart.

5. Advanced Course in German Scientific Literature. *Three hours.*
M W F at 1 1 Asst. Prof. Wait.

FRENCH

1. Elementary Course. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	32	Mr. Kenyon.
II.	M T Th F at 2	28	Mr. Adams.

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 8	26	Mr. Adams.
II.	M T Th F at 9	32	Mr. Kenyon.
III.	M T Th F at 2	26	Mr. Bird.
IV.	M T Th F at 3	28	Mr. Adams.

3. French Scientific Literature. *Four hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 1	28	Mr. Adams.

4. French Scientific Literature continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 9	26	Mr. Bird.
II.	M T Th F at 2	32	Mr. Kenyon.

5. Advanced Course in French Scientific Literature. *Three hours.*

Hours to be arranged. Mr. Bird.

SPANISH

2. Elementary Course continued. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 10	26	Mr. Bird.
II.	M T Th F at 1	32	Mr. Kenyon.

MATHEMATICS

1. Algebra and Analytic Geometry. *Four hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T Th F at 11	218	Mr. Hopkins.
II.	M T Th F at 1	24	Mr. Garretson.

1*a*. Plane Trigonometry. *Two hours.*

SECTION	TIME	ROOM	INSTRUCTOR
I.	M W at 11	27, U	Dr. Running

2. Analytic Geometry. *Four hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 8	24	Mr. Garretson.
II.	M T Th F	at 8	21	Mr. Love.
III.	M T Th F	at 8	218	Mr. Hopkins.
IV.	T W Th F	at 9	28	Dr. Karpinski.
V.	T W Th F	at 9	21	Mr. Love.
VI.	M W F S	at 9	218	Mr. Hopkins.
VII.	T W Th F	at 10	28	Dr. Karpinski.
VIII.	T W Th F	at 10	401	Mr. Garretson.
IX.	T W Th F	at 10	313	Mr. Love.
X.	T W Th F	at 10	218	Mr. Hopkins.
XI.	M T Th F	at 11	24	Mr. Escott.
XII.	M T Th F	at 11	28	Dr. Karpinski.
XIII.	M T Th F	at 11	1	Mr. Garretson.
XIV.	M T Th F	at 11	313	Mr. Love.
XV.	M T Th F	at 11	6	Dr. Field.

2*a*. Spherical Trigonometry. *Two hours.* (Elective.)

SECTION	TIME		ROOM	INSTRUCTOR
I.	T Th	at	22, U	Dr. Pierce.

3. Calculus. *Five hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T W Th F	at 8	6	Dr. Field.
II.	M T W Th F	at 1	313	Dr. Ford.

4. Calculus and Mechanics I. *Five hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T W Th F	at 8	313	Prof. Ziwet.
II.	M T W Th F	at 8	H, U	Prof. Markley.
III.	M T W Th F	at 8	19, U	Prof. Glover.
IV.	M T W Th F	at 8	28	Dr. Karpinski.
V.	M T W Th F	at 9	31	Asst. Prof. Butts.
VI.	M T W Th F	at 9	24	Mr. Escott.
VII.	M T W Th F	at 9	214	Dr. Pierce.
VIII.	M T W Th F	at 10	31	Asst. Prof. Butts.
IX.	M T W Th F	at 10	6	Dr. Field.
X.	M T W Th F	at 2	24	Mr. Escott.
XI.	M T W Th F	at 2	31	Dr. Pierce.
XII.	M T W Th F	at 2	313	Dr. Ford.
XIII.	M T W Th F	at 1	31	Dr. Running.

5. Calculus and Mechanics II. *Three hours.*

SECTION	TIME		ROOM	INSTRUCTOR
I.	M W F	at 11	31	Asst. Prof. Butts.

6. Calculus and Mechanics III. *Two hours.*

SECTIONS	TIME			ROOM	INSTRUCTOR
I.	M	W	at 8	214	**Dr. Pierce.**
II.	T	Th	at 8	214	**Dr. Pierce.**
III.	T	Th	at 8	301	**Dr. Running.**
IV.	T	Th	at 9	6	**Dr. Field.**
V.	T	Th	at 9	19, U	**Prof. Glover.**
VI.	T	Th	at 10	214	**Prof. Ziwet.**
VII.	T	Th	at 10	1, T H	**Dr. Ford.**
VIII.	T	Th	at 10	24	**Mr. Escott.**
IX.	T	Th	at 11	31	**Asst. Prof. Butts.**
X.	T	Th	at 11	27, U	**Dr. Running.**

PHYSICS

2E. Heat, Electricity and Magnetism. *Five hours.*

Lectures M, W, F, at 11. West Lecture Room. Physics Building. **Prof. Carhart.**

Recitations.

SECTIONS	TIME			ROOM	INSTRUCTOR
I.	T	Th	at 8	20, Phys.	**Mr. Henderson.**
II.	T	Th	at 8	312	**Mr. Mellencamp.**
III.	T	Th	at 8	401	**Mr. Boyer.**
IV.	T	Th	at 9	20, Phys.	**Mr. Henderson.**
V.	T	Th	at 9	401	**Mr. Boyer.**
VI.	T	Th	at 9	318	**Prof. Randall.**
VII.	T	Th	at 10	20, Phys.	**Mr. Boyer.**
VIII.	T	Th	at 10	201	**Mr. Henderson.**
IX.	T	Th	at 11	427	**Mr. Colby.**
X.	T	Th	at 11	20, Phys.	**Prof. Randall.**
XI.	T	Th	at 11	217	**Mr. Boyer.**
XII.	T	Th	at 1	201	**Mr. Snyder.**

Course 2 must be preceded by Course 1, and by Course 2 in chemistry.

3c. Laboratory Work in Mechanical and Electrical Measurements. *T~~hree~~ hours.* Fee $3.00.

Laboratory periods.

SECTIONS	TIME			ROOM	INSTRUCTOR
I.	M, 8-12		S, 8-12	A	**Mr. Snyder.**
II.	M, 8-12		S, 8-12	B	**Mr. Boyer.**
III.	M, 1-5	F, 1-5		A	**Mr. Mellencamp.**
IV.	T, 8-12	Th, 8-12		A	**Mr. Snyder.**
V.	T, 1-5	Th, 1-5		A	**Mr. Mellencamp.**
VI.	T, 1-5	Th, 1-5		B	**Mr. Henderson.**

Course 3c must be preceded by Course 2.

4. Primary Batteries. *Two hours.* Fee, $3.00.
Lectures M at 8. West Lecture Room. Prof. Carhart.
Laboratory periods.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T, 8-11	B	Mr. Colby.
II.	W, 8-11	B	Mr. Colby.
III.	Th, 8-11	B	Mr. Colby.
IV.	F, 8-11	B	Mr. Colby.

12. Electrical Measurements.
Continuation of Course 5. *Three hours.* Fee, $2.00.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M at 9	313	Dr. Smith.
II.	M at 10	313	Dr. Smith.
III.	M at 11	318	Dr. Smith.

Laboratory periods.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M, 1-5	C	Dr. Smith.
II.	T, 1-5	C	Dr. Smith.
III.	W, 1-5	C	Dr. Smith.
IV.	Th, 1-5	C	Dr. Smith.
V.	F, 1-5	C	Dr. Smith.
VI.	S, 8-12	C	Dr. Smith.

18. Electrochemistry. *Three hours.* Fee, $2.00.
Hourse to be arranged. Professor Carhart.
Course 18 must be preceded by Courses 3 and 4.

20. Mathematical Electricity and Magnetism. *Two hours.* (Elective.) Hourse to be arranged. Professor Patterson.
Course 20 must be preceded by Course 2 and Mathematics 4 or 6.

CHEMISTRY

2. Elementary Inorganic Chemistry. *Two hours.*
Lectures M and F at 11. Lecture Room, Dental Amphitheatre. Dr. Hale.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	T at 11	205, Ch.	Dr. Hale.
II.	W at 11	205, Ch.	Dr. Hale.
III.	Th at 11	205, Ch.	Dr. Hale.

2*a*. Elementary Inorganic Chemistry. *Two hours.*

Two laboratory periods and one hour of recitation and laboratory work. Fee, $10.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W morning	206, Ch.	
II.	T Th morning	206, Ch.	
III.*	M(1-3) W(1-4)	211, Ch.	Mr. Britton.
IV.*	T(1-3) Th(1-4)	206, Ch.	Mr. Smeaton.

*Sections III and IV are for engineers. The others are for literary students.

2E. Principles of Inorganic Chemistry. *Four hours.*

Lectures W at 11, and S at 11. Lecture Room. Dental Amphitheatre. Mr. Smeaton.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F at 8	216	Mr. Moyer.
II.	T Th at 8	216	Mr. Moyer.
III.	M F at 9	309	Mr. Moyer.
IV.	M F at 10	201, Ch.	Mr. Smeaton.
V.	T Th at 10	201, Ch.	Mr. Smeaton.
VI.	M F at 11	205, Ch.	Mr. Moyer.

3. Qualitative Analysis. *Seven hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	205, Ch.	Prof. Johnson.
II.	M W F at 9	205, Ch.	Prof. Johnson.

Four laboratory periods of three hours each. Open to those who have completed Courses 2*a* or 2E. Fee, $15.

3*a*. Qualitative Analysis. *Four hours.*

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F at 8	203, Ch.	Mr. Carney.
II.	T Th at 8	203, Ch.	Dr. Balcom.
III.	M F at 9	203, Ch.	Dr. Balcom.

Laboratory Work.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-4	214, Ch.	Dr. Balcom.
II.	T Th 1-4	214, Ch.	Dr. Balcom.

Open to those who have completed Courses 2 or 2E. Fee, $10.

Owing to the crowded condition of the laboratories only a few students, other than those for whom it is prescribed this semester, can be allowed to elect the course. Application may be made to Assistant Professor White.

3*b*. Qualitative Analysis, continued. *Four hours.*
Sec. I. T Th at 9. Room 203, Ch. Dr. Balcom.
Two laboratory periods of three hours each to be arranged.
This is a continuation of Course 3*a*. Courses 3*a* and 3*b* are together equivalent to Course 3. Fee, $10.

5. Qualitative Analysis. *Five hours.*
Sec. I. T Th at 9. Room 205, Ch.
Prof. Campbell and Mr. Zimmerschied.
Three laboratory periods of three hours each to be arranged.
Open to those who have completed Course 3 or 3*b*. Fee, $15.

28. Advanced Quantitative Analysis. Laboratory Work. *Five hours.* Mr. Zimmerschied.
Hours to be arranged. Open to those who have completed Course 5. Fee, $25.

29. Iron and Steel Analysis. Laboratory Work. *Five hours.* Professor Campbell.
Open to those who have completed Course 28 and receive special permission. Fee, $25.

31. Independent Work in Mineral Analysis. Laboratory Work. *Five hours.* Professor Campbell.
Open to those who have completed Course 28. Fee, $5.

35. Gas Analysis. Laboratory Work. *Two hours.*
Lecture, M at 1.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M F	1-4	6, Ch.	Asst. Prof. White.
II.	T Th	1-4	6, Ch.	Asst. Prof. White.

Open to those who have completed Course 5, or by special permission to senior students who have completed Course 3*a*. Fee, $5.

38. Chemical Technology. Organic. *Five hours.*
M T W Th F at 11. Room 203, Ch. Asst. Professor White.
Open to those who have completed Courses 7 and 33.

39. Chemical Technology. Laboratory Work. *Three to eight hours.* Professor Campbell and others of the laboratory staff.
Open to those who have completed Courses 28 and 33. Fee, $20.

42. Organic Synthesis. Laboratory Work. *Three, four, or five hours.* Professor Gomberg and Dr. Cone.
Course 42 must be preceded by Course 5, and preceded or accompanied by Course 7. Fee, $15 to $25.

METALLURGY

2. Structure of Metals. Descriptive study of influence of heat and mechanical treatment upon metals and alloys. *One hour.*
Lecture, F at 9. Room 302, Ch. Mr. Zimmerschied.
Open to those who have completed Course 1.

3. Metallography. Laboratory Work. *One hour.* **Fee, $3.**
Sec. I. W 1-4 **Mr. Zimmerschied.**
Sec. II. F 1-4 **Mr. Zimmerschied.**
Must be preceded or accompanied by **Course 2.**

ASTRONOMY

2. General Astronomy. **The Stars and Nebulae.** ***Two hours.***
T Th at 10. **Room 22, U. Professor Hussey.**
3. Spherical **and, Practical** Astronomy. **Use of sextant and zenith telescope.** ***Two hours.***
M W at 10. **Room 22, U. Professor Hussey.**
Practice at Observatory **during a portion of the semester.**
4. Advanced Practical Course. **Work with the equatorial.**
Hours and credit to be arranged. **Professor Hussey.**
5. Theoretical Astronomy. ***Three hours.***
M W F at 11. **Room 22, U. Professor Hussey.**
Must be preceded or accompanied **by Mathematics 4.**
7. Advanced Theoretical Astronomy. **Continuation of Course 5.** *Hours and credit to be arranged.* **Professor Hussey.**

MINERALOGY

1. Elements of Mineralogy. *Two hours.*
Lectures. T Th at 11. **Mineral. Lect. Room, T. H. Professor Kraus.**
In addition, two hours laboratory **work a week; to be arranged.**
A knowledge of elementary inorganic **chemistry is necessary.**
2. General Mineralogy. *Five hours.* **Professor Kraus and Mr. Hunt.**
Lectures M T W Th F at 8. **Mineral. Lect. Room, T. H.**
Laboratory work, five hours **a week, to be arranged.**
Course 2 must be preceded **by Courses 2 and 3 in chemistry.**
3. Crystal Measurements. ***Three hours.* Professor Kraus.**
Lectures and laboratory **work, to be arranged.**
Open to those who have **completed Course 2.**
4. Determinative Mineralogy. ***Two hours.* Mr. Hunt.**
Laboratory work, to be arranged.
Open to those who have **completed Course 1.**
5. Blowpipe Methods. *Two **hours.***
Lectures M W at 8. Min. Lect. Room. **Mr. Hunt.**
In addition, two hours laboratory **work, to be arranged.**
Open to those who have completed **Course 2, or Courses 1 and 4.**
6. Research Work. Credit to be arranged. **Asst. Prof. Kraus.**

GEOLOGY

1. Elements of Geology. *Three hours.*
   Lectures M W at 11. Recitations F at 11. Museum Lecture Room. Professor Hobbs.
   In addition there will be several field excursions, one of which will occupy two or more days.
2. **Historical Geology.** *Three hours.*
   M W F at 9. Professor Hobbs.
   Must be preceded by Course 1.
4. **Field Petrology.** Rapid determination of rock types as required in field mapping. F at 2. Professor Hobbs.
   Must be preceded by a course in mineralogy.
7. **Tectonic Geography.** *Two hours.*
   T Th at 3. Professor Hobbs.
   Must be preceded by Course 1.
8. **Current Literature of Geology.** Continuation of Course 6. One hour weekly. Professor Hobbs.

DRAWING

1. **Geometrical Drawing.** (Elective.) *Four hours.*
   Sec. I. M T Th F from 2-4. Room 403. Mr. Swineford.
2. **Free-Hand Drawing.** (Elective.) *Two hours.*
   Sec. I. M W F from 10-12. Room 35. Miss Hunt.
3. **Free-Hand Drawing.** (Advanced—Elective.) *Three hours.*
   Sec. I. M W F from 10-12. Room 35. Miss Hunt.
4. Descriptive Geometry. *Four hours.*

SECTIONS		TIME	ROOM	INSTRUCTOR
I.	Recitation	M W F at 8	427	Mr. G. F. Hunt.
	Drawing	F 1-3	415	Mr. G. F. Hunt.
II.	Recitation	M W F at 8	413	Mr. Finch.
	Drawing	F 1-3	Hall	Mr. Finch.
III.	Recitation	M W F at 9	413	Mr. Finch.
	Drawing	Th 1-3	Hall	Mr. Finch.
IV.	Recitation	M W F at 9	401	Mr. Bartlett.
	Drawing	Th 1-3	415	Mr. Bartlett.
V.	Recitation	M W F at 10	427	Mr. Fishleigh.
	Drawing	S 10-12	Hall	Mr. Fishleigh.
VI.	Recitation	M W F at 10	413	Mr. Swineford.
	Drawing	S 10-12	Hall	Mr. Fishleigh.
VII.	Recitation	T Th S at 8	427	Mr. Fishleigh.
	Drawing	W 1-3	Hall	Mr. Finch.

5. Advanced Projections and Stereotomy. ***Four hours.***

SECTIONS	TIME	ROOM	INSTRUCTOR
I. Recitation	M T Th F at 11	409	Prof. Denison.
Drawing	S 8-12	415	Asst. Prof. Goulding and Mr. Bartlett.
II. Recitation	M T Th F at 11	428	Asst. Prof. Goulding.
Drawing	S 8-12	415	Asst. Prof. Goulding and Mr. Bartlett.
III. Recitation	M T Th F at 11	401	Mr. Bartlett.
Drawing	S 8-12	415	Asst. Prof. Goulding and Mr. Bartlett.

6*a*. Advanced Projections (Continuation of Course 6). *Two hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	S 8-12	418	Mr. G. F. Hunt.
II.	S 8-12	418	Mr. Finch.

7. Water-Color Drawing. (Elective.) ***Two hours.***

Sec. I. T Th 8-10 Room 35. Miss Hunt.

9*a*. Water-Color Drawing: Historic Ornament and Design. (Elective.) *Three hours.*

Sec. I. T Th 10-12 Room 35. Miss Hunt.

Additional time to be arranged.

10. Free-Hand Lettering. (Elective.) ***Two hours.***

Sec. I. T Th 2-4 Room 403. Mr. Swineford.

24. Architectural Drawing (A) IV. ***Two hours.***

Sec. I. Hours to be arranged. Room 402. Mr. G. F. Hunt.

SHOP PRACTICE

1. Woodwork, Pattern-Making, Foundry, Forging and Metal Forming and Cutting Operations. ***Four hours.***

Fee, $10.00. Mr. McDonald and Mr. Yeatman.

SECTIONS		TIME	TIME OF QUIZ
I.	T Th	from 7:30-12	W at 10
II.	W S	from 7:30-12	F at 1
III.	M F	from 1-5:30	W at 2
IV.	T Th	from 1-5:30	W at 3

2. Pattern-Making and Foundry. (Advanced.) ***Four hours.***

Fee, $10.00. Mr. Bull and Mr. Yeatman.

SECTIONS		TIME	TIME OF QUIZ
I.	M F	from 1-5:30	T at 2
II.	T Th	from 1-5:30	T at 11

3. Machine Shop. *Four hours.*
Fee, $10.00. Mr. Cobb.

SECTIONS		TIME	TIME OF QUIZ
I.	M F	from 1-5:30	W at 1
II.	T Th	from 1-5:30	W at 2

4. Pattern-Making, Foundry and Machine Shop.
Fee, $10.00. Mr. Cobb, Mr. Bull and Mr. Yeatman.
Sec. I. W (1-5:30). S (7:30-12). Th at 1

SURVEYING

1. Lectures or Recitations. Text-book and Field Practice. *Five hours.* Professor Davis, Asst. Prof. Merrick, Mr. Atwell and assistants.
M T W Th F from 1-5. Room 301.
Recitations.
Sec. I. M T W Th F at 10. Room 301.
Other sections to be arranged.

2. Topography, Transit and Stadia, Plane Table, Camera, Field Work and Drawing. *Five hours.* Professor Davis, Asst. Prof. Merrick, Mr. Schmutz and assistants.
Lectures, Field Work and Drawing.
M T W Th F from 1-6. Room 302.

4. Use of Instruments. *Two hours.* Professor Davis, Asst. Prof. Merrick, Mr. Atwell and assistants.
Lectures F at 8. Room 205.
Field Work.
Sec. I. F 9-12.
Sec. II. S 8-12.

7. Geodesy, Geodetic Methods. *Three hours.*
Sec. I. M W F at 8. Room 301. Prof. Davis.

CIVIL ENGINEERING

1. Structural Mechanics. *Five hours.* Must be preceded or accompanied by Course 5 in Mathematics.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T W Th F	at 9	203	Mr. Fulcher.
II.	M T W Th F	at 10	203	Mr. Fulcher.
III.	M T W Th F	at 10	216	Asst. Prof. Tilden.
IV.	M T W Th F	at 11	203	Mr. Fulcher.

4. Engineering Construction. *Two hours.*
Sec. I. M W F at 11. Room 219. Asst. Prof. Wrentmore.
Course 4 must be preceded by Course 2.

5. Hydraulics. *Four hours.* Must be preceded or accompanied by Course 6 in Mathematics.
Lecture for all sections F at 10. Room 309. Prof. Williams.

Recitations—

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M T W Th at 8	205	Prof. Williams.
II.	M T W Th at 9	312	Mr. Stroebe.
III.	M T W Th at 10	205	Prof. Williams.
IV.	M T W Th at 10	312	Mr. Stroebe.
V.	M T W Th at 11	312	Mr. Stroebe.
VI.	T W Th F at 11	205	Mr. Bragg.
VII.	T W Th F at 11	301	Asst. Prof. Greene.

Sections I, III, VI and VII are reserved for civil engineering students primarily.

7. Water Supply Engineering. *Two hours.*
Sec. I. M T W Th F at 9. Room 205. Prof. Williams.
Course 7 must be preceded by Courses 1, 5 and 6.

8. Experimental Hydraulics. *Three hours.* Must be preceded by Course 5.
Hours to be arranged. Prof. Williams.

9. Advanced Structural Design. *Three hours.* Lectures, Computations and Drawing.
M W F 1-4 Room 307. Asst. Prof. Greene.
Course 9 must be preceded by Course 3 and preceded or accompanied by Course 4.

10. Testing Materials. *Two hours.* Asst. Prof. Tilden.
Must be preceded by Course 1.
Hours to be arranged.

11. Elements of Strength and Resistance. Text. *Two hours.*
T Th at 10. Room 427. Asst. Prof. Greene.
Course 11 must be preceded by Course 4 in Mathematics and Course 2 in Physics.

MECHANICAL ENGINEERING

1. Principles of Mechanism. *Four hours.*
Lectures.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	W at 10	409	Prof. Denison.
II.	W at 11	409	Prof. Denison.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W F at 8	401	Mr. Bartlett.
II.	T Th F at 8	428	Asst. Prof. Goulding.
III.	M W F at 9	409	Prof. Denison.
IV.	T Th F at 9	427	Mr. Fishleigh.
V.	T Th F at 10	409	Prof. Denison.
VI.	T Th F at 10	428	Asst. Prof. Goulding.

Drawing.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	W	from 2-4	414	Mr. Bartlett.
II.	W	from 8-10	415	Asst. Prof. Goulding.
III.	W	from 2-4	403	Mr. Fishleigh.
IV.	W	from 8-10	415	Mr. Fishleigh.
V.	T	from 2-4	415	Mr. Bartlett.
VI.	W	from 2-4	415	Asst. Prof. Goulding.

2. Sketching of Machine Details. *Three hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M F	1-5	202	Asst. Prof. Hazelton.
II.	W (1-5) S (8-12)		202	Mr. Swineford.

3. Steam Engines and Other Heat Engines. *Four hours.*
Lecture for all sections W at 10. Room 309. Prof. Allen.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M T Th F	at 8	219	Mr. Bursley.
II.	T W Th F	at 8	217	Mr. Emswiler.
III.	M T Th F	at 9	219	Mr. Knight.
IV.	M T Th F	at 10	219	Mr. Bursley.
V.	M T Th	at 10 & F at 11	217	Mr. Knight.
VI.	M T Th F	at 10	318	Mr. Higbie.

Must be preceded by Course 2 in Physics and 4 in Mathematics.

4. Machine Design. Machine Tools. *Three hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	T Th	1-5	Shops	Supt. Miggett.
II.	M F	1-5	Shops	Mr. Noble.
III.	W (1-5) S (8-12)		Shops	Mr. Noble.

Must be preceded by Course 1.

5. Thermo-dynamics. *Three hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M W F	at 9	216	Asst. Prof. Anderson.
II.	M W F	at 11	216	Asst. Prof. Anderson.

6. Theory Machine Design. *Five hours.*

SECTION	TIME		ROOM	INSTRUCTOR
I.	M T W Th F	at 8	318	Asst. Prof. Hazelton.

Must be preceded by Courses 1 and 4 and Course 1 in Civil Engineering.

7. Steam Laboratory Calibration of Instruments. *Two hours.*

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	1-5:30		Mr. Higbie.
II.	T	1-5:30		Mr. Higbie.
III.	W	1-5:30		Mr. Bursley.
IV.	Th	1-5:30		Mr. Wheeler.
V.	F	1-5:30		Mr. Higbie.

8. Machine Design. Hoisting Machinery. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-5	317	Mr. Emswiler.
II.	M W F 2-5	307	Asst. Prof. Wrentmore.
III.	T Th 1-5	317	Mr. Knight.
IV.	M W F 2-5	418	Asst. Prof. Greene.

9. Steam Laboratory. Testing of Engines and Boiler. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-5:30		Prof. Anderson.
II.	T Th 1-5:30		Mr. Bursley.
III.	W(1-5:30) S (8-12)		Mr. Higbie.

10. Machine Design. Engines and Boilers. *Three hours.*

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M F 1-5	317	Mr. Knight.
II.	T Th 1-5	317	Asst. Prof. Hazelton.
III.	W(1-5) S (8-12)	317	Mr. Emswiler.

12. Power Plants. Power Transmission. *Two hours.*
Sec. I. T Th from 10-12. Room 309. Prof. Allen.

14. Compressed Air and Refrigeration. *Two hours.*
Sec. I. T Th at 9. Room 217. Prof. Allen.

18. Thermodynamics. (Advanced.) Steam Turbines. *Two hours.*
Sec. I. M W at 9. Room 217. Prof. Allen.

21. Design of Power Plants. *Two hours.*
Sec. I. T Th from 1-4. Room 418. Prof. Allen.

ELECTRICAL ENGINEERING

1. Dynamo-Electric Machinery. *~~Three~~ 4 hours.* Fee, $1.00.
Lectures.

SECTION	TIME	ROOM	INSTRUCTOR
I.	T Th at 8	309	Prof. Patterson.

Recitations.

SECTIONS	TIME	ROOM	INSTRUCTOR
I.	M W at 8	203	Mr. De Lay.
II.	W F at 9	313	Mr. Parker.
III.	W F at 10	201	Mr. De Lay.
IV.	W F at 11	214	Mr. Parker.

Laboratory Work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	8-10	101	Mr. Spencer.
II.	T	10-12	101	Mr. Spencer.
III.	W	8-10	101	Mr. Spencer.
IV.	Th	10-12	101	Mr. Spencer.
V.	F	8-10	101	Mr. De Lay.
VI.	S	8-10	101	Mr. De Lay.
VII.	S	10-12	101	Mr. De Lay.

Course 1 must be preceded by Courses 1, 2, 3 and 4 (or 3c) in Physics. It is intended for students not candidates for the degree in electrical engineering.

2. Direct Current Machinery. *Four hours.* Fee, $2.00.

Lectures and Recitations. Prof. Patterson.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M F	at 11	201	Prof. Patterson.
II.	T Th	at 9	309	Prof. Patterson.
III.	T Th	at 11	201	Prof. Patterson.

Laboratory Periods.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	1-5	101	Mr. De Lay.
II.	T	1-5	101	Mr. Parker.
III.	W	1-5	101	Mr. Spencer.
IV.	Th	1-5	101	Mr. Spencer.
V.	F	1-5	101	Mr. De Lay.

Course 2 must be preceded by Courses 1, 2, 3, 4 and 5 in Physics. It is required for candidates in electrical engineering.

4. Alternating Current Motors. *Two hours.* Fee, $1.00.

Lectures and Recitations.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	at 8	201	Prof. Patterson.
II.	F	at 8	201	Prof. Patterson.

Laboratory Work.

SECTIONS	TIME		ROOM	INSTRUCTOR
I.	M	1-4	102	Asst. Prof. Bailey.
II.	W	1-4	102	Asst. Prof. Bailey.
III.	F	1-4	102	Asst. Prof. Bailey.
IV.	S	8-12	102	Mr. Parker.

Course 4 must be preceded by Courses 1 and 3.

6. Design of Electrical Machinery and Appliances. Continuation of Course 5. Drawing. *Two hours.*

Sec. I. T Th 1-5. Room 202. Asst. Prof. Bailey.